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Skeptical Inquirer

THE MAGAZINE FOR SCIENCE AND REASON

Vol. 43 No. 4 | July/August 2019

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TEAM SCIENCE: Building Better Science Activists with Insights from Disney, Marketing, and Psychological Research

Team Science is fighting a very odd war. It is won only when most people we see as "against us" voluntarily choose to join us. Here are ideas on how to get more people to join us, drawing from the worlds of marketing, my previous employer Disney, and psychological science.

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Conspiring for the Common Good

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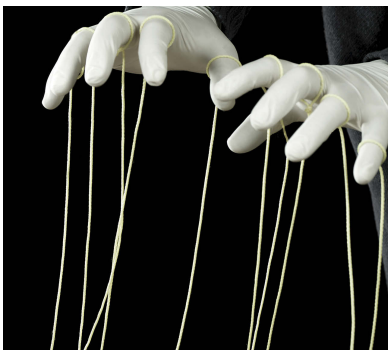
STANLEY RICE



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FELIPE NOGUEIRA

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[FROM THE EDITOR

Effective Science Activism and Three Thanks

We have published several recent articles arguing that to be persuasive in changing the minds of people who believe pseudoscientific claims and appealing misinformation, scientists and skeptics need some better tactics. In a way, Troy Campbell's cover article, "Team Science," is the culmination of this informal, continuing counseling course. Campbell, a social psychologist, is a professor of marketing (University of Oregon), and he brings not just a marketer's understanding of persuasion to skeptics' attention but that of a former "Imagineer" with Walt Disney as well. Who, after all, is more attuned to using all the tools of imagination and entertainment to draw us happily into their world than the creative people at Disney? Now, Disney's studios and theme parks have a few more resources to bring to bear on their audiences than do scientific skeptics, but nevertheless some of what they have learned may be transferrable. Campbell, who spoke on this subject at CSICon 2018, offers a lot of practical advice. He agrees it's unfair that scientists should have to do more than present "the facts," but it *is* a fact that, to be effective in today's world, they do. Also check out his handy sidebar, "Tips for Effective Activism."

Conspiracy theories are everywhere. But how big a change is that? Joseph Uscinski, a political scientist (University of Miami) and a CSICon 2018 speaker, has been studying them for about a decade now. He and colleague Joseph M. Parent (University of Notre Dame) came up with a novel source of data to study the question: all 120,000 letters to the editor of *The New York Times* from 1890–2010. They looked for advocacy or refutation of a conspiracy theory and found, to great surprise, that they are not a new phenomenon: they seem to have existed during all eras studied. Conspiracy theories may be especially prevalent now in political discourse, but they have been a part of the American psyche for a long time. Uscinski's article in this issue gives the details. Their book, *American Conspiracy Theories*, is quoted extensively in an article in the April 22 *New Yorker* by Elizabeth Kolbert.

Investigating a specific popular claim, or related group of them, probably is the prototypical type of Skeptical Inquirer article. But often our authors take a step back and examine a whole field and then present advice for how best to deal with it. That's true of at least two contributions in this issue by our retinue of esteemed regular columnists. Joe Nickell starts with an unfortunate *New Yorker* article from March on premonitions that was notable for its lack of skepticism. He ends up providing nine specific guidelines for evaluating claimed premonitions, each with a small case study to illustrate. In her column, Harriet Hall gives a nuanced overview of alternative medicine and its flaws and then shows how naturopathy, homeopathy, chiropractic, acupuncture, and energy medicine all practice "science envy" in contending their treatments are backed by science, when, of course, they aren't.

* * *

Thank you to *The Guardian* newspaper (UK) for updating its style guide and going further than even the Associated Press (AP) in disallowing use of the word *skeptic* for climate deniers. From the *Guardian's* May 17 article on its style guide changes:

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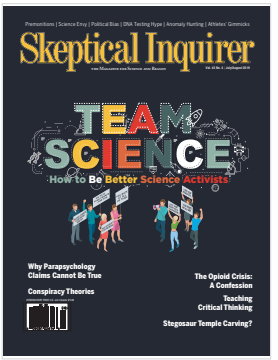

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See Skeptical Inquirer's New, Entirely Redesigned Website

There's an entirely new website for the Skeptical Inquirer and Committee for Skeptical Inquiry, with a new address, a total redesign, and an attractive and user-friendly format. It went live in April 2019. The new address, skepticalinquirer.org, replaces csicop.org as the Skeptical Inquirer website and becomes the official internet home for the magazine and the Committee for Skeptical Inquiry. (And besides, the organization hasn't been called "CSICOP" since 2006.) New magazine articles and blog posts live alongside the easily accessible archive of Skeptical Inquirer magazine issues.

At the new mobile-friendly website, you'll also find articles organized by original issue publication, easy search functionality, an online store with cool skeptic swag, and the @SkeptInquirer Twitter feed, all within a design that matches that of the rest of the Center for Inquiry family of websites: the CFI, *Free Inquiry*/Council for Secular Humanism, and Richard Dawkins Foundation for Reason & Science sites.

Once you go to skepticalinquirer.org, the menu in the upper right corner is your guide.

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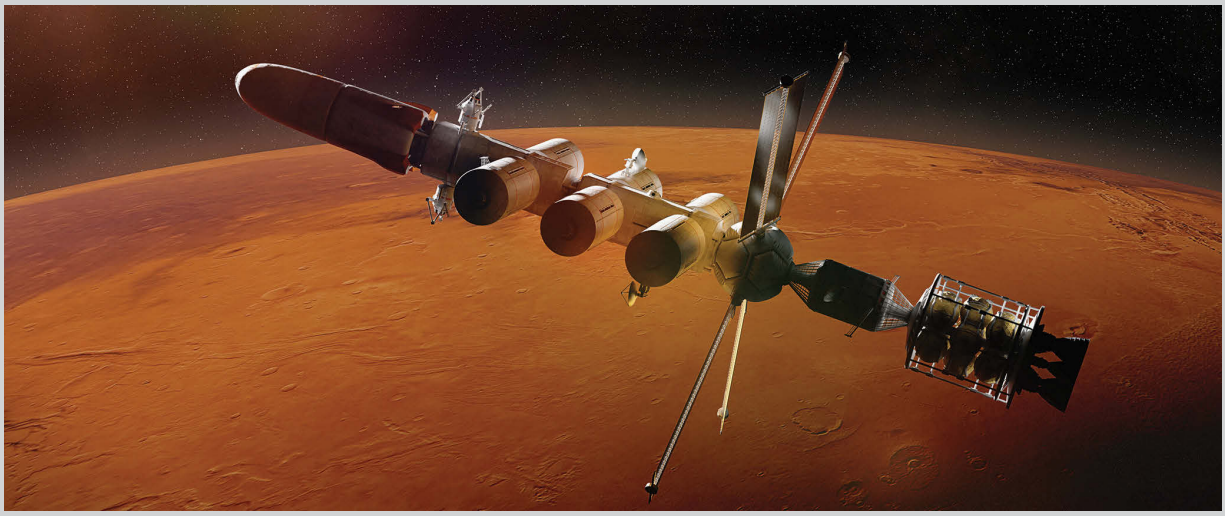
"I am so pleased with the new look of the Skeptical Inquirer website," says CSI Executive Director Barry Karr. "It is so crisp and clean and so much easier to navigate. This is the first major redesign of the Skeptical Inquirer site since 2009, and the old site was starting to show its age. We hope that with the easily accessible and convenient digital subscription included our readers will now be able to take the Skeptical Inquirer with them wherever they go."

"This has been a year-long continuing project of our great web people under the encouragement and support of top management and the CFI Board," said Skeptical Inquirer Editor Kendrick Frazier. "I think it is a wonderful improvement. Hope you do as well."

Space Exploration: Robots vs. Humans

David Morrison



What should be the roles of humans and robots in space exploration, including the search for life beyond Earth? This question will be important for the newly announced NASA goal of human landings on the Moon by 2024, followed by a lunar outpost and future human flights to Mars.

Sometimes this issue is posed as a binary choice: humans or robots. But this oversimplifies the issues. First, the answer is almost certainly context dependent. It should be discussed separately depending on the mission being considered. For example, humans might be very useful in exploring the Moon or Mars, but they certainly are not appropriate for the moons of Jupiter. Humans are important on the International Space Station, but they would be worse than useless for an astrophysics mission. Second, this really is a false dichotomy. Humans are deeply involved in all space missions, but in an age of telepresence and artificial intelligence, they do not necessarily need to be physically present. As one example, consider a human on Mars's moon Phobos teleoperating a vehicle on the martian surface; she would not be on Mars, yet certainly she would be part of a space mission. Or compare that with the same human on Earth teleoperating a vehicle on the martian surface. Where do we draw the line? How important is it for a human to be physically on another world?

One of the most challenging situations involves the search for life beyond Earth. This is probably the most important question in space science, and as far as we know Mars is the most likely place for life that is within reach for detailed exploration. Mars is also the one place where humans might realistically live off-Earth. The problem is that we really don't know how to search for life remotely, especially if we consider the possibility of truly alien biochemistry. The Viking mission nearly fifty years ago was the only attempt that has been made to land a robotic life-detection instrument on Mars, and it failed to answer the questions despite near-perfect instrumental performance. Almost surely a team of humans on Mars could do a much better job, and that might be the only way to approach such a challenging task. However, the presence of humans, who carry with them a complex microbial ecosystem (their microbiome) from Earth, could mask or even destroy any indigenous life. By sending humans, we might end forever our one chance of finding exolife (to say nothing of the ethical issue of possibly destroying the native life of another planet).

By sending humans, we might end forever our one chance of finding exolife.

One then begins to consider other ways to approach this issue, such as defining "safe" or quarantined areas on Mars where humans could land without the risk of contaminating the entire planet. The aforementioned teleoperations by a human on Phobos offer another possibility. But would any astronaut be willing to devote a major part of their professional life to a trip to Mars but not be permitted to actually land there? These issues about the role of humans in space are about to become important to scientists and (potentially) to the public, and they need skeptical analysis.

David Morrison is a NASA space scientist and Skeptical Inquirer contributing editor.

Lorraine Warren Dead at Ninety-Two

Joe Nickell

Lorraine Warren—who with her late husband "investigated" alleged demon-possessed houses—died at ninety-two on April 19, 2019. The couple—real names Edward Warren Miney (1926–2006) and Lorraine Rita Warren (1927–2019)—founded New England Society for Psychic Research allegedly as early as 1952. Ed would claim to be a "Demonologist"; his business card with that title appeared to represent his total qualifications. For her part, Lorraine was a self-professed "Clairvoyant" who claimed to make otherworldly contacts—with ghosts and demons, even one masquerading as a werewolf, and, on one occasion, a telepathic Bigfoot.

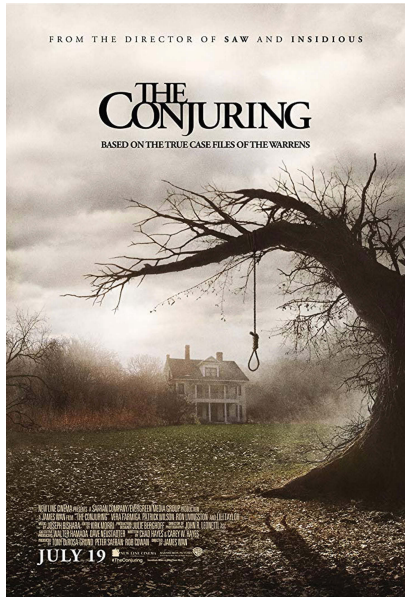
Photo: Autumn Driscoll

Their career developed into something of a racket, and they were labeled "charlatans" and "scaremongers." Their *modus operandi* was to arrive at a reputedly haunted house that was garnering publicity. Typically, the residents would be fellow Catholics, whom the medieval-minded Warrens soon convinced were actually being plagued by demons. An "exorcism" of sorts would often be arranged, followed by a lucrative book deal and eventually a "true" Hollywoodized movie.

I crossed paths with the Warrens and their minions here and there. For example, with publication of the book on which the later movie *The Haunting in Connecticut* (2009) was based, I appeared with hauntee Carmen Snedeker on *The Maury Povich Show* and later with the Snedekers and Warrens on *Sally Jesse Raphael* (for the Halloween 1992 broadcast). There I met a blustering, would-be bullying, demon-huckstering Ed Warren who, backstage, swore like a sailor.

The Warrens had been marginally involved with *The Amityville Horror* case of the 1970s, but Lorraine's clairvoyance failed her. Not only did I learn from later residents that some reputed damage in the house had never occurred, but William Weber (attorney for Ronald DeFeo, who had murdered his family there) eventually admitted the horror story was a hoax: it had been concocted over bottles of wine consumed by original Amityville claimant George Lutz.

Lorraine was a self-professed "Clairvoyant" who claimed to make otherworldly contacts.



Again, my on-site investigation at another house, made famous by *The Conjuring* movie (2013), turned up mundane causes for phenomena the Warrens interpreted as demonic. They proposed a book and movie deal to the original spooked residents; however, the current owners—having lived there since 1987—continue to be demon-free, as I can attest.

Some of the Warrens' coauthors have since admitted that Ed told them to make up incidents and generally create "scary" tales. Ray Garton, who wrote the book on which *The Haunting in Connecticut* was based, has effectively repudiated it, saying he was glad it went out of print.

Still, although the Warrens are now both dead, we must yet be vigilant for future claims of alleged Warren "investigations." Despite the couple having little if any involvement with the Enfield Poltergeist house of north London in 1977, they were nevertheless made central to that story related in *The Conjuring 2* movie. Skeptics may have to exorcise Warren nonsense from demon tales for years to come.

Joe Nickell is CSI's senior research fellow.

Why Parapsychological Claims Cannot Be True

The claims of parapsychology violate causality, time's arrow, thermodynamics, and the inverse square law. They cannot be true.

ARTHUR S. REBER AND JAMES E. ALCOCK

The July-August 2018 issue of *American Psychologist* contained an article titled "The Experimental Evidence for Parapsychological Phenomena: A Review" by Etzel Cardeña. Cardeña is known for research on hypnosis and consciousness, parapsychology, and, interestingly, for his work in theater as an actor and director. The paper prompted us to examine and critique the science behind parapsychology (Reber and Alcock, forthcoming). This article is a summary of our arguments.

The *American Psychologist* is the flagship publication of the American Psychological Association (APA), the largest and most influential professional organization in our field, and it is sent to its nearly 120,000 members. An article being published within it is equivalent to granting the imprimatur of the APA. Interestingly, this wasn't the first time the APA had entered this controversial domain of psychology; in 2011, another of its respected journals, the *Journal of Personality and Social Psychology*, published a paper by Daryl Bem of Cornell University that purported to show evidence of precognition. Bem's paper lit a small firestorm largely because Bem was well-known for research in fields outside of parapsychology. It was applauded enthusiastically by psi researchers and, of course, was immediately subjected to efforts at replication by other labs (which almost uniformly failed) and well-honed criticisms, including one by one of us (Alcock 2011).

Cardeña's paper was, to the eye untutored in the world of the paranormal, an impressive effort. It reviewed the data for psi, focusing mainly on meta-analyses of published papers that showed small or marginal effects and, importantly, acknowledged the fact that there is no coherent theory for psi. Cardeña, in an effort to find a causal mechanism through which to understand the paranormal, brought in quantum mechanics (QM) and, to a lesser extent, relativity theory and the recently proposed notion of a "block universe" model in which past, present, and future all enjoy a simultaneous coexistence. The effort failed—mainly from some unfortunate misunderstandings of QM, relativity theory, and the fact that the block universe notion is little more than creative speculation.[1]

Cardeña's paper was, to the eye untutored in the world of the paranormal, an impressive effort.

While the paper bothered us on several levels, our primary concern was that it was symptomatic of a larger, more important issue that was being missed. It is not a matter of reviewing the existing database, scratching at the marginal and highly suspect findings of meta-analyses for something that passes the "< .05" cutoff point. It is not a matter of rummaging around in arcane domains of theoretical physics for plausible models. It is more basic than that: parapsychology's claims cannot be true. The entire field is bankrupt—and has been from the beginning. Each and every claim made by psi researchers violates fundamental principles of science and, hence, can have no ontological status.

We did not examine the data for psi, to the consternation of the parapsychologist who was one of the reviewers. Our reason was simple: the data are irrelevant. We used a classic rhetorical device, *adynaton*, a form of hyperbole so extreme that it is, in effect, impossible. Ours was "pigs cannot fly"—hence data that show they can are the result of flawed methodology, weak controls, inappropriate data analysis, or fraud. Examining the data may be useful if the goal is to challenge the veracity of the findings but has no role in the kinds of criticism we were mounting. We focused not on Cardeña specifically but on parapsychology broadly. We identified four fundamental principles of science that psi effects, were they true, would violate: *causality*, *time's arrow*, *thermodynamics*, and the *inverse square law*.

Causality. Effects have causes. Bridging principles identify the causal links for observed effects. The appropriate response to circumstances that lack such a mechanism is skepticism or an existential agnosticism—and, historically, this has been the case. Newton's notion

of gravity as "action at a distance" was considered suspect until rescued by Einstein's relativity theory; mystics' claims to control autonomic functions were thought to be scams until the discovery of biofeedback; Wegener's theory of continental drift was viewed skeptically until mid-ocean ridges and sea-floor spreading were discovered.

Within the study of psi, there are no causal mechanisms, and none have been hypothesized. Worse, there is virtually no discussion over whether the claimed effects have singular or multiple causal mechanisms or why the purported findings lack coherency. If psychokinesis affects the roll of dice in a psi lab, why not at craps tables? If telepathy exists, why are our brains not constantly abuzz with the thoughts of those around us? To maintain that the future puts in appearances—but only in psychology labs at Lund or Cornell—is to strain credulity to the snapping point. There are no patterns here. As we noted in our paper, "It is as if actors from a dozen different plays have appeared on the same stage in a discordant farrago."

Time's arrow. Within parapsychology time is turned upon itself, most glaringly in precognition. Psi researchers have tried to explain this through QM, in particular the "entanglement" effect. It won't work. It's true that the spin of two particles separated in space are *entangled* (the state of one is simultaneously aligned with the other), but there is no *reversal* of time, simply concurrent effects. In the so-called "twin paradox" the twins age at different rates, but neither gets younger. As we argued, "The notion that the strangeness of the quantum world harbors an explanation of the strangeness of parapsychology is a false equivalency." QM is a physical theory but not in the ordinary, Newtonian sense that we confront in daily life. As Nobelist Richard Feynman has quipped on many an occasion, "It is safe to say that nobody understands quantum mechanics"—outside of the mathematics. And as quantum theorist Jonathan Dowling noted in his 2013 book *Schrödinger's Killer App*, there is nothing in QM that entails paranormal effects. If anything, it rules them out (Dowling 2013).

Thermodynamics. Again, take precognition. If the future affected the present, it would violate the thermodynamic principle that energy cannot be created or destroyed in an isolated system. The act of choosing a card from a fixed array, a common procedure used in psi research, involves neurological processes that use measurable biomechanical energy. The choice is presumed to be caused by a future that, having no existential reality, lacks energy. And it won't work to argue that by virtue of time reversal the system isn't closed. If that were true, all systems would be subject to this "borrowing" of energy from the future, leading to the incoherent conclusion that the First Law no longer applies anywhere.

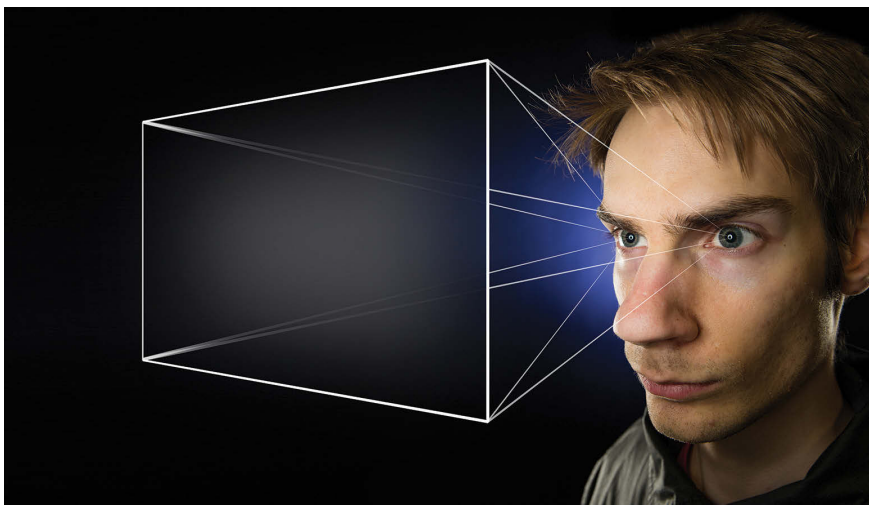
Inverse square law. In telepathy, the distance between the two linked persons is never reported to be a factor, a claim that violates the principle that signal strength falls off with the square of the distance traveled. Psi researchers again import the "entanglement" effect as a possible explanation for this, but it won't work. In QM, there is no transmission of energy between the separated particles; it is only that they are "entangled."

Parapsychology's claims cannot be true. The entire field is bankrupt—and has been from the beginning.

In short, parapsychology cannot be true unless the rest of science isn't. Moreover, if psi effects were real, they would have already fatally disrupted the rest of the body of science. If one's wishes and hopes were having a psychokinetic impact on the world—including computers and lab equipment—scientists' findings would be routinely biased by their hopes and beliefs. Results would differ from lab to lab whenever scientists had different aims. The upshot would be empirical chaos, not the (reasonably) ordered coherent picture developed over the past several centuries.

At the close of our paper, we wondered why parapsychology still exists as a field of study. Why are some scientists still focused on the impossible? For 150 years, we've witnessed a cycle. Evidence for psi is announced with fanfare then later falls into disregard. A new theory is proposed then abandoned. A novel methodology is introduced but, when findings are not replicated, is discarded. Each time there's a resurgence of interest when another apparently successful result is reported. Lather, rinse, repeat.

This enterprise has involved literally thousands of papers, hundreds of conferences, dozens of review volumes, and *nothing has been learned*. Parapsychology is precisely where it was in the 1880s. Why, we wondered, are researchers still running experiments, using ever-more sophisticated statistical techniques,



reaching out to ever-broader realms of science, expanding their analyses into studies of consciousness and mind? This pattern of persistent belief in the anomalous may be the most psychologically interesting phenomenon associated with the study of psi. One of us (Alcock 1985) has argued it is likely linked with a vague sense that science, hard-nosed and physicalist, lacks that mysterianist element found in religious or spiritual realms. The lure of the "para"-normal emerges, it seems, from the belief that there is more to our existence than can be accounted for in terms of flesh, blood, atoms, and molecules. A century and a half of parapsychological research has failed to yield evidence to support that belief.

However, for us, the alluring mysteries are the ones that emerge from the straightforward study of the astonishingly complex, inviting world of normal science in all its mechanistic glory. ■

Note

1. Our paper was vetted by two experts in quantum mechanics, one of our choosing and the other chosen by the journal editor. Both assured us that our comments about physics in general and quantum mechanics in particular were correct.

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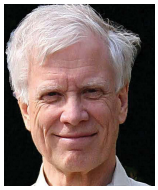

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[FROM THE EDITOR

continued from p. 4

> Other terms that have been updated, including the use of "wildlife" rather than "biodiversity," "fish populations" instead of "fish stocks," and "climate science denier" rather than "climate skeptic." In September, the BBC accepted it gets coverage of climate change "'wrong too often'" and told staff: "You do not need a 'denier' to balance the debate."

You'll remember that our Committee for Skeptical Inquiry campaigned to have news organizations change their usage in this regard. A statement signed by sixty CSI fellows and issued December 5, 2014, "Deniers Are Not Skeptics" (SI, March/April 2015 and on our website), got worldwide publicity and helped lead the AP to revise its policy. Physicist and CSI Fellow Mark Boslough, who spearheaded our campaign, considers the new *Guardian* policy "good news" and hopes it will inspire his fellow skeptics to ask other news organizations to make similar style guide updates.

* * *

Thank you to the creators, cast, and writers of *The Big Bang Theory* for twelve years of extraordinarily clever and witty television featuring a group of quirky young scientists who uncompromisingly love learning and knowledge and become a family of friends we all can somehow identify with. And for a classy and moving final double episode on May 16 that remained true to their scientific brilliance, acceptance of each's shortcomings, and appreciation of true friendship. No other comedy series has ever so consistently exalted science (and skepticism) in such a hugely popular format watched and beloved by millions.

* * *

Thank you to the Apollo program astronauts, engineers, scientists, mathematicians, and technicians and to that era's political leaders, administrators, tens of thousands of aerospace workers, and the American taxpayers who were responsible for the Apollo program, which on July 20 celebrates the fiftieth anniversary of the Apollo 11 first landing on the moon. Everyone alive that day remembers it—an epic achievement in human history and culture. Although humans haven't been back to the moon since 1972, our unmanned planetary spacecraft have since explored every planet in the solar system and many of its distant moons and asteroids. They are a continuing testament to the curiosity and intelligence of the humans who created them.

—Kendrick Frazier

The Not So Divine Acts of Medium 'John of God'

Felipe Nogueira

John of God (*João de Deus*, real name João Teixeira de Faria) is a well-known Brazilian medium who claims to have healed several people through his spiritual surgeries. According to one John of God website, he is "arguably the most powerful unconscious medium alive today and possibly the best-known healer of the past 2000 years."

John of God's healing center is located in Abadiânia, a small town in Brazil's central-west region that has a population of about 20,000. Opened in the 1970s, the healing center is named Casa Dom Inácio de Loyola. It is visited by about 2,000 people each week, including international travelers seeking John of God's alleged healing skills. Part of his popularity might be explained by the fact that Brazil is the country where Spiritism has the largest number of followers. It was Chico Xavier, one of the most important Spiritism leaders in Brazil, who directed John of God to create his now-famous healing center.[1]

Several videos on YouTube show John of God performing spiritual (or "psychic") surgeries in his healing center. He claims the surgeries are performed when he is channeling the spirits or entities of past doctors and saints. John of God's repertoire of surgeries does not seem to vary much, from doing an incision with a scalpel in the abdominal skin to inserting forceps up the nose to superficially scraping the eye with a knife. Most people, if not all, wear white clothes. The surgeries are free of charge, as is attending the healing center. However, John of God also prescribes an herbal medicine that is only sold in his healing center's pharmacy. Due to a high number of visitors, the tourism business in the city has largely expanded.

In 1991, TV Globo, Brazil's largest TV broadcaster, made a TV show about Brazil's spiritual surgeons, John of God being among them. A couple of his "patients" were interviewed about possible surgery effects. Not everyone reported improvements, and that's the case of women with eye problems given the eye scraping surgery. But even in the case of claimed benefits, it is difficult to confirm the person was really cured. For instance, a women claimed that she was able to move one of her paralyzed arms, while the other arm continued to be "semi-paralyzed."

In 2005, James Randi was asked to give his opinion for an ABC-TV show about John of God. After that, Randi wrote a comprehensive analysis of John of God's procedures (Randi 2014). Randi explains that the surgery involving the forceps up the nose is actually an old trick from India and first done in America in 1926. It is known as the "Blockhead trick," and, according to Randi, it's performed today by performers in carnivals and sideshows around the world. Moreover, Randi stated that his famous million-dollar prize would be given if someone could scrape the eye's cornea with a knife with no anesthesia without producing a flinch in the person.

Medium John of God performs so-called "psychic surgery" while supposedly channeling the spirits of past doctors and saints.

Joe Nickell published a Skeptical Inquirer article in 2007 about his attendance at one of John of God's events in Atlanta. Nickell was directly instructed to wear white clothes because "it helps frequency." Nickell was spot-on when he wrote: "They are pseudosurgeries that have no objective medical benefit other than the well-known placebo effect." Interestingly, he also mentioned that emotions—such as those of the pilgrims at the John of God healing center—might trigger endorphin release, which could help reduce pain sensitivity (Nickell 2007).

In 2016, *VEJA* magazine (Lopes and Nogueira 2016) reported that a year earlier, feeling abdominal pain, John of God was given an endoscopy that revealed an aggressive stomach cancer. Instead of spiritual surgery, John of God chose real, proven medical surgery that took ten hours to remove the six-centimeter tumor. He also used chemotherapy for five months. When asked why he chose science rather than another faith healer like himself, John of God replied, "Does the barber cut his own hair?"

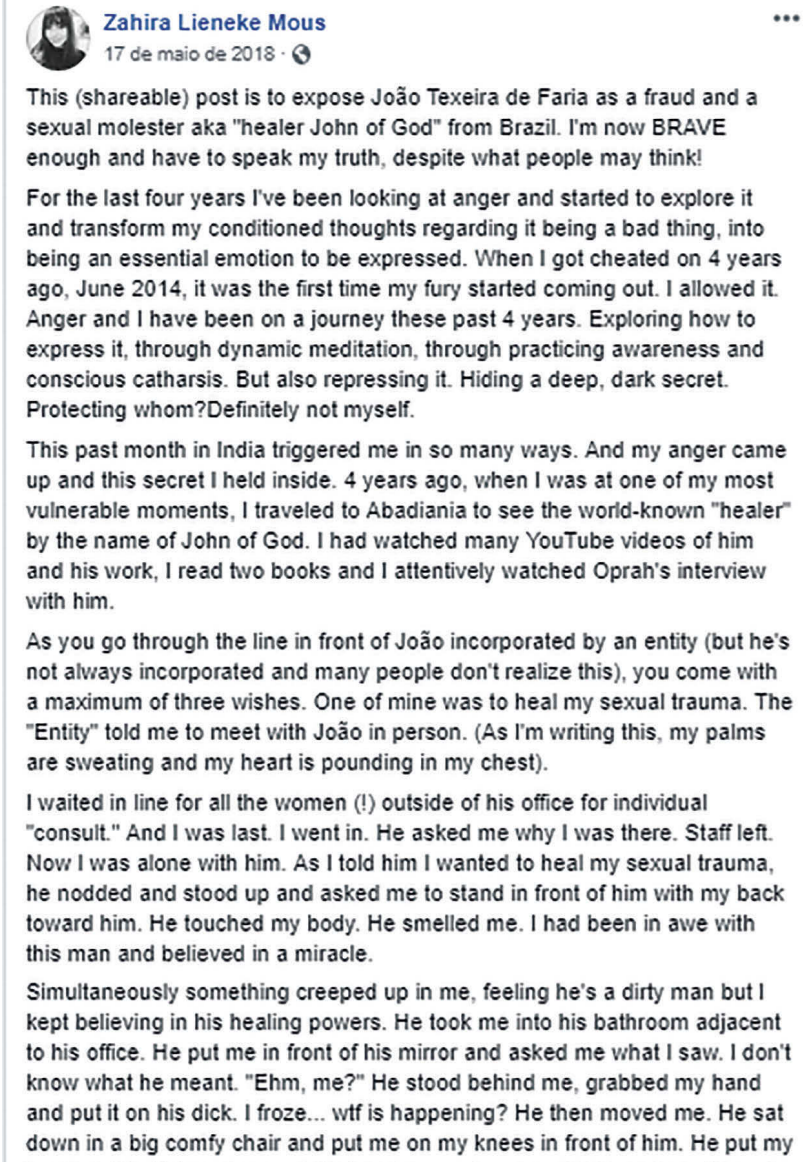
John of God became internationally famous when an episode of *The Oprah Winfrey Show* was devoted to him in 2010. Oprah Winfrey herself traveled to Abadiânia in 2012 to interview him and attend one of his healing sessions; she later said, "What I just witnessed almost made me pass out."

She was not the only celebrity to pay him a visit. The long list includes Shirley MacLaine in 1991, Naomi Campbell in 2015, Paul Simon in 2017, and Ronaldo (the Brazilian soccer star) in 2018. Two former Brazilian presidents were "treated" by him: President Lula, after being diagnosed with larynx cancer, was briefly visited by John of God and had a spiritual surgery, and President Dilma Rousseff also had several surgery sessions in 2008.

But the image of a "saint" healer in a person who brings God in his own name now has been tainted. On Friday, December 7, 2018, Brazilian journalist Pedro Bial, for his talk show *Conversa com Bial*, interviewed ten women claiming to have been sexually abused by John of God.[2]

One woman, who did not want to be identified, went to Abadiânia in 2013 after going through a divorce. In the open session, the claimed entity in John of God told her to meet the medium in his private room after the session. In it, John told her he would be behind her to perform an "energy alignment." Then John told her to put her hands on his penis, as that was the cleansing and she needed his energy that comes only that way. Another victim, a Dutch choreographer named Zahira Mous, came forward with a similar abuse report and confessed she did not go to the police because she was afraid that evil spirits would be sent and her life would become miserable. Furthermore, even though she suffered, Mous thought for a while that he was healing many people. Mous came forward in April 2018 when she posted on Facebook what happened to her at one of John of God's sessions.

The show also included Amy Biank, a tourist guide who had previously worked in the healing center. Biank used to bring many pilgrims to the Casa. One day she was waiting outside John's private room. Biank heard a yell



Zahira Lieneke Mous
17 de maio de 2018 ·

This (shareable) post is to expose João Texeira de Faria as a fraud and a sexual molester aka "healer John of God" from Brazil. I'm now BRAVE enough and have to speak my truth, despite what people may think!

For the last four years I've been looking at anger and started to explore it and transform my conditioned thoughts regarding it being a bad thing, into being an essential emotion to be expressed. When I got cheated on 4 years ago, June 2014, it was the first time my fury started coming out. I allowed it. Anger and I have been on a journey these past 4 years. Exploring how to express it, through dynamic meditation, through practicing awareness and conscious catharsis. But also repressing it. Hiding a deep, dark secret. Protecting whom?Definitely not myself.

This past month in India triggered me in so many ways. And my anger came up and this secret I held inside. 4 years ago, when I was at one of my most vulnerable moments, I traveled to Abadiania to see the world-known "healer" by the name of John of God. I had watched many YouTube videos of him and his work, I read two books and I attentively watched Oprah's interview with him.

As you go through the line in front of João incorporated by an entity (but he's not always incorporated and many people don't realize this), you come with a maximum of three wishes. One of mine was to heal my sexual trauma. The "Entity" told me to meet with João in person. (As I'm writing this, my palms are sweating and my heart is pounding in my chest).

I waited in line for all the women (!) outside of his office for individual "consult." And I was last. I went in. He asked me why I was there. Staff left. Now I was alone with him. As I told him I wanted to heal my sexual trauma, he nodded and stood up and asked me to stand in front of him with my back toward him. He touched my body. He smelled me. I had been in awe with this man and believed in a miracle.

Simultaneously something creeped up in me, feeling he's a dirty man but I kept believing in his healing powers. He took me into his bathroom adjacent to his office. He put me in front of his mirror and asked me what I saw. I don't know what he meant. "Ehm, me?" He stood behind me, grabbed my hand and put it on his dick. I froze... wtf is happening? He then moved me. He sat down in a big comfy chair and put me on my knees in front of him. He put my

Portion of the abuse report by Dutch choreographer Zahira Mous.

for help and entered the room, where she witnessed John of God with his pants down and a woman on her knees who was being forced to perform oral sex on him. Biank explained that she was instructed to sit on the couch and shut her eyes. She did so, later recognizing that at the time she was indoctrinated to listen to John of God and to think that the healing center was holy. After a second yell, Biank opened her eyes, which stopped John of God, who said the girl has passed a "test" and was "special." To stop this from happening with more women, Biank talked to the Casa's workers. One of them told Biank she cleaned a little girl's mouth of supposed "ectoplasm," which in fact was John's semen.

In the following days, five more cases were announced in the media. To investigate the reports against John of God, the Public Prosecutor's Office of Goias state organized a task force consisting of five attorneys and two psychologists. In only a day and a half, the task force received seventy-eight complaints. The number of complaints has since grown dramatically to 330 on December 13 and 600 on December 16.

It got worse. In a shocking cover story headlined "My Father Is a Monster," *VEJA* magazine interviewed Dalva Teixeira, one of John of God's daughters. She claimed to have been abused and raped between the ages of ten and fourteen. At age fourteen, she got pregnant by one of the workers at John of God's center. After discovering the pregnancy, John beat her so badly that she lost the baby and still carries scars from the attack. Teixeira, according to some media reports, sued her father, requesting a compensation of fifty million reais (around $13 million).

One week after the first accusations were broadcast by Bial's show, the Public Prosecutors' Office requested the arrest of John of God, after he withdrew thirty-five million reais from several bank accounts. He was considered a fugitive for almost a day, surrendering himself to the police on December 16. During investigations at John of God's residences, the police found six firearms, precious stones, and more than 1.5 million reais in cash, leading to an investigation for money laundering.

The revelations have shocked many Brazilians, who considered John of God a sacred healer and holy man. But in fact this was not the first time he was accused of a crime. As Nickell noted, John of God had been charged and jailed briefly due to the illegal practice of medicine. Moreover, in 1980, John of God was accused of homicide but was not charged due to lack of evidence. This homicide and other criminal accusations of John's past were brought to light in a new update report on his case by TV Globo on March 24. For instance, one of his victims claimed that in 1973 John of God raped and attempted to murder her with three gunshots. A CT scan confirmed the woman's claim that one of the bullets was still inside her neck. On March 22, John of God was transferred from the prison to a hospital, where he has been since. (As of May 20, he is only allowed to stay in the hospital until May 31.)

This horrible situation brings up important questions from the skeptical movement. For instance: Where were other spiritual mediums? Why couldn't (or didn't) they stop it? Remember that Chico Xavier[3] allegedly channeled messages regarding John of God's mission. But during all those years of abuse no medium in the world channeled any spirit that could warn or say something about John of God? Furthermore, skeptics such as Randi and Nickell have argued that John of God was no more than a charlatan. This situation also illustrates what many skeptics have pointed out: people of faith have a low bar to believe something is true. We have to continue to expose charlatans such as John of God and keep asking for good evidence, even if it offends some believers. What is really offensive is not asking for evidence; it is taking advantage of people in what might be the most desperate moments of their lives and abusing them in the name of their faith. ■

Acknowledgments

I thank Bruno Oliveira for his comments and suggestions for this article. I also thank Ricardo Costa and Daniel Fleischman for countless reviews and discussions in previous articles.

Notes

1. John of God's official website says the Casa was opened by him in 1976 in Abadiânia. The website, however, also says that in 1978 spirits sent a message to John through his friend Chico Xavier, designating the town of Abadiânia to host the center. The website confusion continues, stating that Chico Xavier channeled a new message in 1993, which confirmed that Abadiânia was the city for John's mission. In that year, a family donated the land where today the healing center is located. Was the center already opened for several years or not?

2. Journalist Pedro Bial interviewed ten women, but due to TV time constraints only four appeared on his talk show.

3. Chico Xavier and his claimed psychographic skills have been analyzed previously and concluded to be a fake by Kentaro Mori (Mori 2010).

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Massless Is Not *Nonmaterial*

SADRI HASSANI

Pseudoscientists and Eastern mystagogues have been propagating the myth that only objects that have mass are material. Their efforts have been so successful that even some physicists adhere to that myth. Here is an astrophysicist describing the myth to a gleeful Dalai Lama: "You can see [energy transforming into mass] happening in elementary particle processes. A photon is transformed into two material particles: an electron and an antielectron. Material is produced from pure energy, from a photon" (Zajonc 2004, 205). The statement is actually wrong in more than one way (Hassani 2016, 46).

Using four different approaches, this commentary shows that the myth of nonmateriality of massless particles is just that—a myth.

Let's start with what is *not* material. Everyone, including the most opportunistically dishonest pseudoscientist, agrees that spirit, soul, God, universal consciousness, as well as "energy," "field," and "energy field" transmitted via the practice of qi, reiki, touch therapy, prayer, and other alternative medical protocols are nonmaterial. What is common among them is that they cannot be seen, heard, touched, or subjected to any quantifiable measurement. Let's summarize this by saying that nonmaterial objects are not *detectable*. The undetectability of nonmaterial entities suggests that detectability determines the materiality of an object. Depending on the physical properties of the material objects, we can identify at least three kinds of detectors: sensuous, interactive, and microscopic.

Pseudoscientists and Eastern mystagogues have been propagating the myth that only objects that have mass are material.

Sensuous: Whatever affects our senses is material. A wooden table is material because we can feel its existence by touching it. The sound of a symphony orchestra is material because it is transmitted to our ears through the material air. We smell a rose because the material fragrance emitted by the flower affects our nose. The sensation of bitterness or sweetness can be accomplished only by a material object put in our mouth. That our senses are detectors was Epicurus's remarkable contribution to the Greek atomic theory.

To amplify the notion of materiality, it is instructive to consider the extreme cases of sensation. As we catch a ball, it pushes on the palm and fingers of our hand, causing the sensation of touch and perhaps a little pain. As the velocity of the ball increases, so does the pain. In the most extreme case, we may get a rupture in our hand—or lose a finger or two. The pleasant warmth felt on our hands held at a safe distance above a flame can burn our hands if we bring them close enough to the flame. A sound of sufficiently high volume can cause deafness.

Interactive: Another way of identifying material objects is via the effect they have on—i.e., how they interact with and change the state of—other material objects. Interactivity is at the heart of the detection by senses. Epicurus was the first to think of sensation as the interaction between the atoms and our senses. In fact, interactivity is the primary characteristic of all material objects. A moving tennis ball is material because it changes direction when it interacts with the racket. A car is material because it changes direction when it hits another car. Water is material because it displaces material objects in its path when it is massive enough and moves sufficiently fast. Air is material because it can uproot trees and buildings when it is in the form of a hurricane.

Microscopic: All material objects are made of atoms, which must themselves be material. The test of their materiality is again their interactivity. Two hydrogen atoms interact with one oxygen atom to form a water molecule, a countless number of which combine to form oceans, seas, rivers, and clouds. Electrons and nuclei are material because they interact via electrical forces to form atoms. Protons and neutrons are material because they interact via strong nuclear forces to form nuclei.

As you have perhaps noted, I have left out the most important of all senses—sight—and what it detects: light. This was on purpose! Light consists of pho-

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tons, which are massless particles. And the matter-antimatter annihilation (or the decay of certain elementary particles) into photons, falsely identified as "pure energy," gives mystics and pseudoscientists of all denominations the opportunity to exploit $E = mc^2$ and claim that modern physics "proves" the unity of soul (nonmaterial, thus massless) and body (with mass, therefore material).

How can we prove pseudoscientists wrong? How can we show that photons are different from soul and spirit? How do photons fit in the three descriptions of materiality discussed above?

Sensuous: Our most accurate sense organ is our eye. A healthy eye can detect a single photon. The view of a source of light such as the moon and stars has a pleasing effect on our sense of sight. But, as in other senses, the extreme could be damaging. Direct exposure to the sun, or an intense laser beam, can blind us.

Interactive: Light is an electromagnetic wave. "Light" of low enough frequency can interact with a material antenna connected to a radio, television, or smartphone and produce material electrical currents that operate the device. Laser light can dissect tissues in laser surgery; if it is intense enough, it can cut through metals. Sunlight can be pleasantly warm to our skin. But extended exposure to the sun disrupts the normal functioning of skin cells and may result in carcinoma. The most extreme interaction of photons, which can bring about instant death, is caused by gamma rays—photons of extremely high energies—produced in nuclear explosions.

Microscopic: Photons are the most prominent interactors in the microworld. In almost all nuclear processes photons are produced. When an electron and a proton interact, they produce not only a hydrogen atom but also a photon. One of the most useful methods of studying atoms is X-ray spectroscopy in which photons (X-rays) interact with atoms to reveal the structure and properties of elements. Light amplification, for which the first two letters in the acronym LASER stand, is done by the interaction of photons with certain "lasing" atoms.

What is common among the nonmaterial is that they cannot be seen, heard, touched, or subjected to any quantifiable measurement.

Mathematical: There is yet another indication, no weaker than a mathematical proof, that photons are material. In 1939, Eugene Wigner, a Hungarian-American physicist, applied the abstract mathematics of Lie groups to special relativity and quantum mechanics to prove that a physical particle can be labeled by at least two numbers, one representing the particle's mass and the other a property called spin (whose understanding is not crucial at this point), *either of which could be zero*. Electron, proton, and neutron are examples of particles that have both mass and spin. The famous Higgs boson is a particle that has mass but no spin. A photon is a particle with spin but no mass. And if a Nobel Prize adds any credence to Wigner's work, his proof won him the prize in 1963.

In conclusion, a photon passes all tests of materiality. The soul, universal consciousness, qi energy, etc., fail them; they are simply figments of the imagination of generations of mystics and theologues. No commonality exists between massless objects and mystical concepts. ■

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Premonition! Foreseeing What Cannot Be Seen

An article in the March 4, 2019, *New Yorker* gave the regrettable impression that some people could do what science—and common sense—say cannot be done: see something (usually a tragedy) before it has occurred. (The magazine followed other outlets that have recently hawked paranormal claims—*The New York Times* regarding UFOs in 2017 and 2018 [Nickell 2018a; Nickell and McGaha 2018] and CBS's *Sunday Morning* touting ESP in 2018 [Frazier 2018].)

At issue here is the aforementioned *New Yorker* article, Sam Knight's "The Premonitions Bureau." While one might expect therefrom a lesson in critical thinking regarding pseudoscientific views, Knight has adopted a "who-knows?" attitude, for which I intend this article as a corrective. (Thanks to psychologist Stuart Vyse—author of *Believing in Magic: The Psychology of Superstition* and a fellow of the Committee for Skeptical Inquiry—for suggesting this topic to me.)

Aberfan Disaster

Knight focuses on the work of an eccentric psychiatrist, John Barker, who was a member of the British Society for Psychical Research (SPR). Founded in 1882, the SPR studies spiritualism, hauntings, thought transference, and the like. Its members tend to be credulous, despite some exposés of fraudulent mediums.

Barker became impressed by premonitions that were reported in the wake of the Aberfan disaster of 1966 in South Wales. Sliding coal slurry engulfed a school, killing 140, including 116 children. Barker came to believe the premonitions were evidence of the paranormal. He subsequently dedicated himself to collecting such reports in his British Premonitions Bureau, hoping to prevent future disasters. But after two of his most promising informants predicted his own untimely demise, he died—though not by a nonexistent "gas supply" or "a dark car" as one psychic had suggested but, later, from a brain hemorrhage at home. (Other premonition registries have since followed.)

New Yorker writer Knight seems not to understand the critical-thinking adage, "incredible claims require incredible proof." He remarks, "Premonitions are impossible, and they come true all the time. The second law of thermodynamics says it can't happen, but you think of your mother and then she calls."

Major Problems to Consider

Evaluating premonitions—whether they come as dreams, hunches, or some other form—is essentially a study in matching something reportedly imagined with something that subsequently happened. There are really few rules as to how much evidence is required, for example, or how close a match must be. Such problems will become clearer as we look at some of the factors that may be involved. I illustrate each with a case in point.

1. Alleged premonitions that are reported in the wake of an event are not proof of anything, because they may be mental confabulations constructed after the fact.

From time to time, people have fearful dreams, as well as fleeting feelings of dread and momentary musings of possible future happenings. If nothing comes of one of these it is forgotten, but should there be some momentous occurrence, it can draw such a feeling from memory or even imagination. Soon one has confabulated a tale that blossoms in the subsequent retellings. (*Confabulation* is a term psychologists use to refer to confusing fact with fiction. Unable to retrieve something from memory, the confabulating person, perhaps inadvertently, manufactures something that is seemingly appropriate to replace it. "Thus," explain Wortman and Loftus [1981, 204], "the man asked to remember his sixth birthday combines his recollections of several childhood parties and invents the missing details.")

Consider an anecdotal case provided by a Shanghai jurist. Sir Edmund Hornby related how, years earlier, he was awakened one night by a newspaperman who had arrived belatedly to get the customary written judgment for the next day's edition. The man—looking deathly pale—would not be put off, and Hornby provided him a summary, which the reporter took down in his pocket notebook. After he left, the judge related the incident to Lady Hornby. The following day, however, he learned not only that the man had died during the night but that his wife and servants were certain he had not left the

house. Yet with his body was discovered a notebook containing a summary of Hornby's judgment!

This case of an apparent premonitory apparition was reported by psychical researchers, but it soon succumbed to investigation. As it turned out, the reporter did not die at the time Hornby gave (about 1 AM) but much later—between 8 and 9 AM. Moreover, Judge Hornby could not have told his wife about the visitation, because he was then between marriages. Finally, although the tale depends on a certain judgment that was to be delivered the following day, no such judgment was recorded. When confronted with this evidence of error, Judge Hornby admitted, "My vision must have followed the death (some three months) instead of synchronizing with it ... ." Bewildered by what had happened, he added, "If I had not believed, as I still believe, that every word of [the story] was accurate, and that my memory was to be relied on, I should not have ever told it as a personal experience" (Hansel 1966, 186–189).

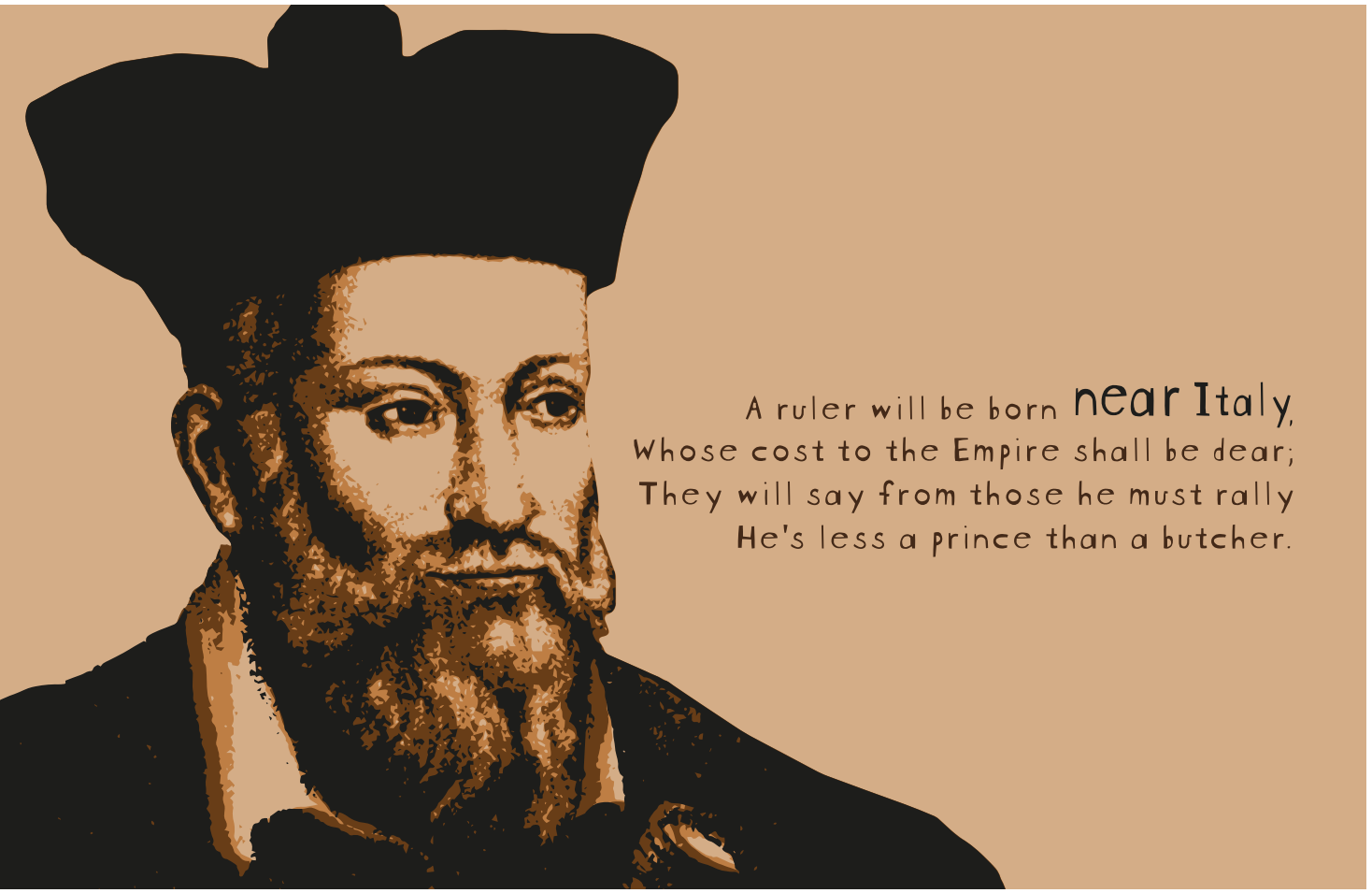
Unable to retrieve something from memory, the confabulating person, perhaps inadvertently, manufactures something that is seemingly appropriate to replace it.

2. Some prediction accounts may be misleading in their details.

An example concerns the late psychic Jeane Dixon. Many people still believe that Dixon scored a psychic coup by forecasting a sensational event: the assassination of President John F. Kennedy. Actually, however, she merely claimed that a president elected in 1960 would die in office—an assertion based on certain astrological notions. But she nullified her forecast in 1960 as the election drew close, publicly predicting that Richard M. Nixon would become president. If Nixon had instead been elected and died in office, no doubt Dixon would have then claimed to have predicted that (Nickell 1994, 166–167)!

3. Some longstanding premonition stories may have been altered over time.

An example, one of the best-known reputedly precognitive dreams in history, was related by President Abraham Lincoln—first to his wife, then again to Ward Hill Lamon, his close friend and bodyguard. As Lamon later reconstructed the president's words, Lincoln had, some ten days previously, gone to bed when he soon began to dream and felt "a death-like stillness" about him. Hearing "subdued sobs, as if a number of people were weeping," he left his bed and wandered downstairs, through room after room of the White House. Finally, he arrived at the East Room where he came upon a catafalque "on


A ruler will be born near Italy,
Whose cost to the Empire shall be dear;
They will say from those he must rally
He's less a prince than a butcher.

which rested a corpse wrapped in funeral vestments." He asked one of the soldiers standing guard, "Who is dead in the White House?" The soldier answered, "The President; he was killed by an assassin." The story may be true, but in any event, I discovered Lamon had added a sequel that is invariably ignored. After Lamon was told of the dream and had expressed his concern, Lincoln pointed out: "In this dream it was not me, but some other fellow, that was killed. It seems that this ghostly assassin tried his hand on someone else." Thus, Lincoln had not thought he foresaw his own death but instead that of another president (Nickell 2001, 112–113). That changes the whole tale.

In any case, it is hardly surprising that Abraham Lincoln should have dreamed about assassination—even his own. Prior to his first inauguration in 1861, Pinkerton detectives (including America's first female detective, Kate Warne) had smuggled Lincoln into Washington, D.C., at night to avoid a change of trains in Baltimore, where an assassination plot had been uncovered. In time, Lincoln received numerous death threats and on one occasion had a hole shot through his top hat by a would-be assassin (Nickell 2001, 113).

4. A psychic's story may have been inflated by the insertion of an alleged precognitive vision.

I encountered an example of this upon appearing with a psychic on the *Mark Walberg Show* (televised in 1996). The supposed visionary claimed he had solved over a hundred homicides, and I challenged him to name one. He cited the case of two young women in Harrison, New York. The psychic, Ron Bard, claimed that he was able to psychometrize (object-read) a key on one victim's body. He foresaw, he claimed, the case being solved by his directing police to a certain door in the South Bronx where "the key worked in the lock and that's how we found the murderer." In fact, newspaper accounts and a letter to me from the Harrison police chief told a different story. Bard had not had any involvement, though his mother had tried to insinuate herself as a psychic in the case. The only key in the case belonged to one of the victims, and the case was solved, the chief told me, by "diligent police work, not visions" (Nickell 2001, 210–213).

5. A prediction made in advance is subject to retrofitting (after-the-fact matching). That is, once an event has occurred, details may be interpreted in various ways to better harmonize the prediction with the event.

A prediction made in advance is subject to retrofitting (after-the-fact matching). That is, once an event has occurred, details may be interpreted in various ways to better harmonize the prediction with the event.

Such is the explanation for the supposed accuracy of many of Nostradamus's prophetic utterances. Born Michele de Notre-Dame (1503–1566), but better known by the Latinized Nostradamus, he was a French astrologer noted for his quatrains (four-line rhyming verses). Written in vague, symbolic language, they could be interpreted in different ways at different times. Therefore, with retrofitting, an event could look in hindsight as if it had been predicted by the supposed seer. For example, quatrain I:60 reads (in my own translation from Middle French):

> A ruler will be born near Italy,
> Whose cost to the Empire shall be dear;
> They will say from those he must rally
> He's less a prince than a butcher.

The phrase "near Italy" covers a lot of ground, from Austria and Corsica to France and Switzerland to Greece and Yugoslavia. The verse is usually held to refer to Napoleon (1769–1821), but other candidates include the Holy Roman Emperor Ferdinand II (1578–1637) and even Adolph Hitler (1889–1945). (See Nickell 2010, 34–35.)

6. In the process of retrofitting, the retrofitter may seek credit for details that were not actually specified.

Consider, for instance, a prediction by professional psychic Bernice Golden (whom I knew personally). She forecast on December 20, 1981, that "major difficulties may arise concerning an important nuclear power plant that could cause more static than ever before." Note the vague "difficulties" and "static" and the equivocal "may."

I'll wager Golden was as shocked as anyone when a steam tube ruptured (which she did not foresee) at the Ginna nuclear power plant east of Rochester (that went unnamed), sending radioactive steam into the air and forcing an emergency declaration—none of which she specified. (The Three Mile Island accident had occurred in 1979, stoking public fears, and there had already been another plant accident before Golden's prediction [Nickell 2018b].)

A retrofitter may also be guilty of omitting details that have proven to be erroneous—especially any that would cast doubt on a supposed prediction.

7. An old psychics' trick is to make shocking predictions to attract attention, later shrewdly counting the hits (exaggerating and retrofitting as necessary) and simply ignoring the misses.

This technique makes wild guessing a rather safe practice. A credulous public helps by remembering or forgetting accordingly.

One such practitioner was the late psychic Dorothy Allison, who claimed she had a "vision" about a missing five-

year-old boy. Not only did her pronouncements cause police to waste considerable time and resources in following up on her claims, digging up a drainage pipe for example, but the boy's body was actually found floating in a pond, by a man seeking a spot to bury a dead cat. Nevertheless, Allison cleverly revised the facts and converted her failure into a seeming success, mentioning details of the boy's clothing she had supposedly foreseen accurately (Dennett 1994, 45–46).

8. Hoax stories are not infrequently told by various alleged psychics, astrologers, fortunetellers, and the like to boost their images.

Not surprisingly, several seers predicted the assassination of Ronald Reagan—based on the same astrological notions that Jeane Dixon had applied to the 1960 election. However, while most soothsayers merely gave vague renderings of the stock prediction, California psychic Tamara Rand provided astonishingly accurate information regarding John Hinckley's attempted assassination of President Reagan on March 30, 1981. Reportedly, on a January 6 radio talk show, Rand (real name Naomi Randall) predicted that Reagan would experience a "thud" in the chest toward the end of March, that there would be shots fired "all over the place," and that the attempted assassin would be fair-haired and have a name "something like Humbly—maybe Jack."

Unfortunately, the astonishing accuracy was due not to psychic powers but to a deliberately concocted hoax. The tape was actually made the day *after* the assassination attempt, not three months earlier as claimed (Frazier and Randi 1981). The talk show host, Dick Maurice, and his producer, Gary Greco, had been approached by Rand, who said, "This could make me the Jeane Dixon of the eighties" (Nickell 1994, 166–167).

9. Alleged precognitive visions can be part of a larger scam.

One of my favorite examples (due to the irony of the outcome) is that of the late, notorious Sylvia Browne. Early in her career, long before adding an *e* to her surname, she and her then husband sold securities to a touted gold-mining venture. Browne claimed to strongly foresee that the mine would pay big dividends. However, although telling a couple their $20,000 investment was to be used for immediate operating costs, the Browns transferred the money to an account for their Nirvana Foundation for Psychic Research. Browne not only failed to foresee her and her husband's own resulting bankruptcy but also their subsequent felony convictions (Nickell 2012, 249–250).

10. Then there is the common problem of determining probability. As Martin Gardner (1986, 8) observes, "There simply is no way to evaluate the degree to which a dream runs counter to ordinary statistical laws." (When, for instance, there are numerous opportunities for an unusual event—a plane crash for example—it becomes likely to happen. This is the principle known as the law of large numbers [Wiseman 2010, 153].)

In his *The Wreck of the Titanic Foretold?*, Gardner examines what he terms, "The single most impressive example of seeming precognition of the *Titanic* disaster, or any other disaster." It is a short novel *Futility* by Morgan Robertson, published in 1898, fourteen years before the sinking of the *Titanic*! Consider just a few of the numerous parallels between Robertson's fictitious wreck *Titan* and the *Titanic*:

- The *Titanic* was 882.5 feet long, the *Titan* 800 feet.
- Both ships were all steel, considered unsinkable, and described as the largest passenger ship ever built.
- Both had too few lifeboats.
- Both began their fatal voyage in April, and both impacted an iceberg near midnight.

Of course, we must assume the novel had not been read by those designing and naming the later ocean liner.

(As an example of the many questionable "precognitive dreams" that came in the wake of the *Titanic*'s sinking is one attributed to a woman who lived in New York City. Unpublished until 1949, that tale does not even give the names of the persons involved. Nevertheless, it asserts a woman awakened her husband the night the *Titanic* sank to say she dreamed her mother was in a lifeboat, although, supposedly, she had never told her daughter she had booked the passage. Though unnamed, she allegedly did survive the disaster [Gardner 1986, 7–23].)

A Final Word

The foregoing examples illustrate several important considerations regarding alleged precognitive visions and dreams, but they are not intended to represent a complete list. Reports of alleged premonitions should be examined on a case-by-case basis, always remembering claims that seem too good to be true (as, for instance, in the story by Judge Hornby in number 1 above), may well be just that. ■

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[REALITY IS THE BEST MEDICINE HARRIET HALL

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Science Envy in Alternative Medicine

One definition of *alternative medicine* is medicine that is not supported by good enough evidence to have earned a place in mainstream medicine. Comedian Tim Minchin asked, "What do you call alternative medicine that works? Medicine." That's a simplistic answer good for laughs, but the truth is a bit more complicated.

Alternative medicine embraces many things: treatments that have never been tested or have not been adequately tested; treatments that have been tested and shown *not* to work; treatments that are based on nonexistent phenomena such as human energy fields and acupoints; treatments such as homeopathy that if true would violate established scientific knowledge; and treatments that have been proven to work but that mainstream doctors have good reasons not to recommend.

Some examples of those reasons:

- Tai chi has been proven to reduce falls in the elderly, but other more conventional treatments might be more suitable, cheaper, or more available.
- Kava has been proven to reduce anxiety, but it appears to be toxic to the liver and has been banned in many countries.
- Garlic has been proven to reduce blood pressure and cholesterol, but the effect is too small to be clinically significant, and we have drugs that are more effective and safer.
- St. John's Wort is an effective antidepressant, but products on the market are highly variable, may not contain what the label says, and may not have enough of the active ingredient.
- Red yeast rice lowers cholesterol. It does so because it contains the same active ingredient as the prescription drug lovastatin. But it also contains a lot of other stuff that isn't needed and might be harmful. The prescription drug is standardized, regulated, contains precise amounts, is less expensive, is covered by insurance, and has an effective system in place to monitor it for side effects.
- Chewing willow bark relieves headaches, but aspirin works better and is readily available, well regulated, and inexpensive. Why would anyone choose chewing bark over taking pills and accept an unknown dose of a less effective painkiller?

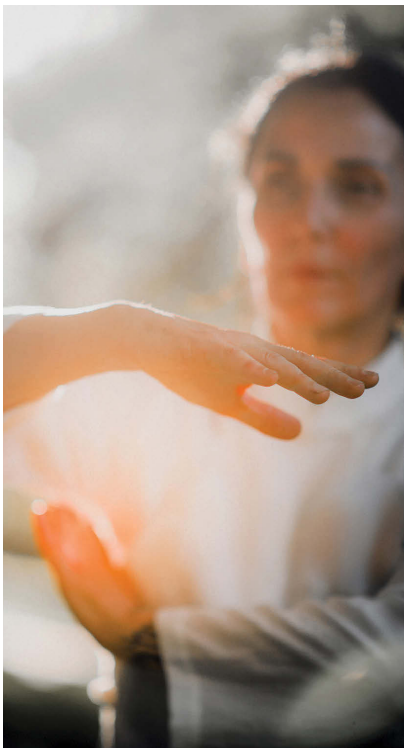
Standardization is lacking in the herbal medicine marketplace, and many products have been found to be contaminated with everything from prescription drugs to carcinogens to insect parts and floor sweepings.

CAM and Science

CAM stands for complementary and alternative medicine. In his book *Snake Oil Science*, research methodologist R. Barker Bausell wrote, "CAM therapists simply do not value (and most, in my experience, do not understand) the scientific process."

They are satisfied with anecdotal evidence and don't understand the need for rigorous testing. When patients report feeling better, that reinforces their beliefs and is all the evidence they want. When they try to do science, they tend not to do it right.

Writing in *The Spectator*, Edzard Ernst said, "I have been in this business for a very long time now, I have published more papers on alternative medicine than any other researcher on this planet—and yet, I have never come across an alternative therapy that clearly and demonstrably outperforms conventional medicine."



When they are criticized for not having good scientific evidence to support what they are doing, alternative medicine practitioners realize that while science is not important to them, it is important to others. So, they naturally want to persuade others that their treatments are backed by science. They demonstrate science envy. They are science wannabes. They say, "But we are scientific too; here's the proof." Their protestations don't hold up to scrutiny but are a source of amusement to good scientists and critical thinkers.

Naturopathy and Science Envy

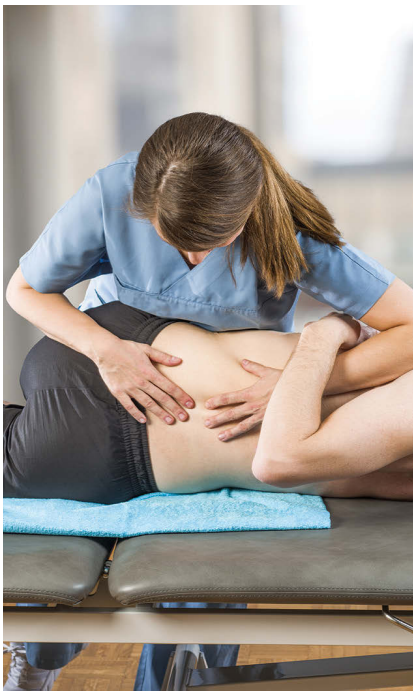
Researchers at Southern Cross University in Australia were alarmed when a government review found no clear evidence demonstrating the efficacy of many natural therapies and proposed to stop funding them. So Southern Cross did their own review of the literature on naturopathy, analyzed thirty-three studies, and claimed to have found evidence that naturopathic medicine works for a wide range of chronic conditions. Professor Stephen Myers noted:

> We discovered there's a body of evidence that shows naturopathic medicines are effective for a range of cardiovascular diseases, lowering blood pressure, changing cholesterol levels, musculoskeletal pain, polycystic ovarian syndrome, anxiety, depression and a wide range of chronic conditions including things like hepatitis c … . We looked at the research that had been done on whole-of-practice naturopathic medicine and not isolated tools of trade. We weren't interested in just herbal medicine alone or nutritional supplements alone, we're interested in this concept called whole system or multi-modality practice.[1]

Dr. John Dwyer, emeritus professor of medicine at the University of New South Wales and the founding president of Friends of Science in Medicine, questioned the study's definition of naturopathy and said the study damaged the reputation of Southern Cross University. The lifestyle changes naturopaths recommend are not specific to naturopathy but are the same ones mainstream healthcare professionals recommend. If they work, that's not evidence that naturopathy works.

The study was published in what Dr. David Gorski has called a pseudomedical journal,[2] *The Journal of Alternative and Complementary Medicine* (JCAM), edited by John Weeks. Weeks is a longtime cheerleader for alternative medicine who is neither a scientist nor a physician. Gorski eviscerated naturopathy's claim to be science-based: "Science. You keep using that word. I do not think it means what you think it means. I also can't help but be amused at how quacks are so desperate to adopt the term 'science-based.' Let's just put it this way. If your 'profession' embraces homeopathy, it can never be described as science-based. Ever."[3]

CAM therapists are satisfied with anecdotal evidence and don't understand the need for rigorous testing.



Gorski pointed out that the studies they analyzed were at high risk of bias and were not double-blinded. Only one was randomized. The best evidence they could come up with was GIGO (garbage in/garbage out). They made grandiose claims for studies that were mostly crap. Gorski's conclusion: "Of course naturopathy can tart itself up with science all it likes, but as long as it continues to embrace vitalism, homeopathy, and all manner of quackery, it will never be science-based, no matter how much Mr. Weeks believes otherwise."

Homeopathy and Science Envy

Homeopathy is arguably the most unscientific alternative medicine. It postulates that a remedy becomes more effective when the active ingredient has been diluted out of existence. It has been tested and shown not to work, and from what we know about physics, chemistry, and biology, it *could not possibly work* as intended. Yet it tries to defend itself with poor science and historical evidence. Homeopaths love to cite statistics from nineteenth-century cholera and typhoid epidemics where patients treated with homeopathy were more likely to survive than patients treated with conventional medicine. Those historical successes are easily explained. Doctors of the time were using remedies that often actively caused harm, but homeopathic remedies did nothing, so of course the results were better. Homeopathy was just a way of avoiding iatrogenic harm. Today's conventional medicine is much safer and more effective.

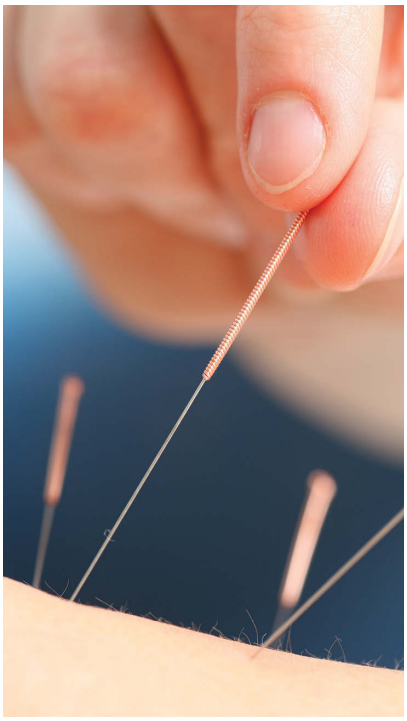
Sure, you can find positive trials of homeopathy, but the effects are inconsistent and small in magnitude, and the research designs are flawed. The body of evidence is resoundingly negative. Homeopathy is not scientific; it doesn't work and couldn't possibly work. Nevertheless, they keep trying to explain *how* water might retain memories without ever establishing that it *does*—and without explaining how such memories could affect health.

Chiropractic and Science Envy

Chiropractic was invented by a grocer

and "magnetic healer" in 1895. For well over a century, it has been trying to establish scientific respectability and has failed. A group of chiropractors has even established that the core chiropractic concept of "subluxation" has no valid clinical applicability.[4] When Simon Singh was sued for libel by the British Chiropractic Association (BCA) for saying chiropractic treatments for certain childhood ailments were bogus, the BCA produced their scientific evidence: a list of twenty-nine studies. Steven Novella evaluated those studies.[5] He found that twelve were irrelevant and the other seventeen were poor quality, cherry-picked, and implausible. The BCA omitted better designed studies with negative outcomes. A typical study found that chiropractic doesn't work for colic, but parents reported that it does. That's not scientific evidence of effectiveness.

The quality of chiropractic research is abysmal. I once reviewed their "top ten chiropractic studies of 2013."[6] I found small studies with no control group, negative results, evidence of bias, poor research design, questionable clinical relevance, and junk science. And these were the *best* studies chiropractors could find to brag about!



Acupuncture and Science Envy

Acupuncture has been studied up the yin-yang (pun intended) for decades. A rigorous evaluation of the evidence by Steven Novella and David Colquhoun concluded acupuncture is a theatrical placebo.[7] They said the most parsimonious explanation for the positive studies is bias and noise in the data; the positive studies are likely false positives. They commented, "Since it has proved impossible to find consistent evidence after more than 3,000 trials, it is time to give up." But acupuncturists keep doing poorly designed studies that prove nothing. They are determined to torture science until they can make it confess that their beliefs are correct. I angered one acupuncturist by saying there was no good evidence, and he set out to find the evidence and prove me wrong. Instead, he proved himself wrong and quit acupuncture. I admire him. How many people would renounce their occupation when confronted with uncomfortable facts?

Alternative medicine practitioners demonstrate science envy. They are science wannabes. They say, "But we are scientific too; here's the proof."

Energy Medicine and Science Envy

Energy medicine covers a lot of territory, including Reiki, distance healing, faith healing, bioresonance therapy, and therapeutic touch. These disparate practices are united by belief in an undetectable human energy field or other force. Pseudophysics and quantum theory are invoked to explain their mysterious actions, but explanation is useless unless the actions can be proven to exist. As a schoolgirl, Emily Rosa demonstrated with a simple experiment that therapeutic touch practitioners can't do what they think they can; they can't even detect the presence of a human energy field.

Analogy with Penis Envy

Freud's theory of penis envy was never widely accepted. He thought females who lacked male organs envied them. It never rang true for me. I never wished for the actual male organs; in fact, I thought those dangly bits might be rather inconvenient. What I *did* envy was the societal prestige and power that males seemed to enjoy. Similarly, alternative medicine envies the prestige and power that good scientific evidence lends to therapeutic claims. That doesn't necessarily mean they want to do good science or even understand what it is, much less know how to do it. If they really understood science, they probably wouldn't have become involved with alternative medicine in the first place. Science is the only reliable method for understanding reality; I wish they would embrace it, not envy it. ■

Endnotes

1. https://www.abc.net.au/news/2019-03-08/southern-cross-university-naturopathy-study/10879232
2. https://sciencebasedmedicine.org/naturopaths-try-and-fail-yet-again-to-argue-that-they-are-science-based/
3. Ibid.
4. https://chiromt.biomedcentral.com/track/pdf/10.1186/1746-1340-17-13
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7. https://journals.lww.com/anesthesia-analgesia/Fulltext/2013/06000/Acupuncture_Is_Theatrical_Placebo.25.aspx

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Who Are More Biased: Liberals or Conservatives?

Recently Jane Mayer (2019) of *The New Yorker* wrote about the very close relationship between Fox News and President Donald Trump, outlining in great detail how the Murdoch family–owned news outlet functions as a tacit communication operation of the Trump White House and its political agenda. There is a revolving door of former Fox News staff working in the White House and former White House staff working at Fox News, and according to many sources quoted in the article, Fox News has erased the lines of journalistic integrity and is now functioning as a Trump propaganda machine. Mayer argued that with respect to programming, it was often unclear whether Trump controlled Fox News or Fox News controlled Trump.

Meanwhile, the president himself continues to decry the "Fake News Networks," by which he seems to mean any outlet to the left of Fox News. According to anonymous sources cited in Mayer's article, President Trump had such animus toward CNN that he attempted to block AT&T's purchase of Time-Warner, the parent company of CNN. The Trump Administration's Department of Justice sued to block the merger, but in June a district court judge approved the deal (Ivanova 2018).

Conservatives who, like the president, believe the mainstream media (MSM) have a liberal bias have been supported by evidence that journalists are more likely to identify as Democrats than Republicans. A 1990 poll of forty-nine editors and writers at *The Washington Post* found only one person, Tony Kornheiser, a sports columnist, was a registered Republican, and he suggested he was a RINO (Republican in name only): "I don't think the Republican Party would claim me" (Wemple 2017). A 2014 study conducted by the University of Indiana School of Journalism found that 28 percent of journalists surveyed identified as Democrat and 7 percent as Republicans. Fifty percent said they were Independents (Willnat and Weaver 2014).

Conservatives who believe the mainstream media have a liberal bias have been supported by evidence that journalists are more likely to identify as Democrats than Republicans.

Donald J. Trump @realDonaldTrump · Mar 7
It was not a campaign contribution, and there were no violations of the campaign finance laws by me. Fake News!
28K 21K 103K
Donald J. Trump @realDonaldTrump · Mar 6
Democrats just blocked @FoxNews from holding a debate. Good, then I think I'll do the same thing with the Fake News Networks and the Radical Left Democrats in the General Election debates!
52K 44K 182K

In recent years, Ad Fontes Media has produced a media bias chart for many of the most popular news sources (see Figure 1). The horizontal axis of the chart plots the left or right political bias of the source, and the vertical axis plots the factual nature of the reporting, ranging from "contains inaccurate/fabricated info" at the bottom to "original fact reporting" at the top. The result is an inverted-U–shaped function with the most politically biased sources on both ends of the spectrum rating low on factual material (e.g., Occupy Democrats, Breitbart News), and the most politically neutral sources tending to be the highest in factual material. For example, the Associated Press, Reuters, and Bloomberg were rated both among the highest in original fact reporting and the lowest in political slant. There are a few media sources that occupy the bottom middle of the chart. For example, the *National Enquirer* is given only a modest right-ward skew but is also very low on factual information.

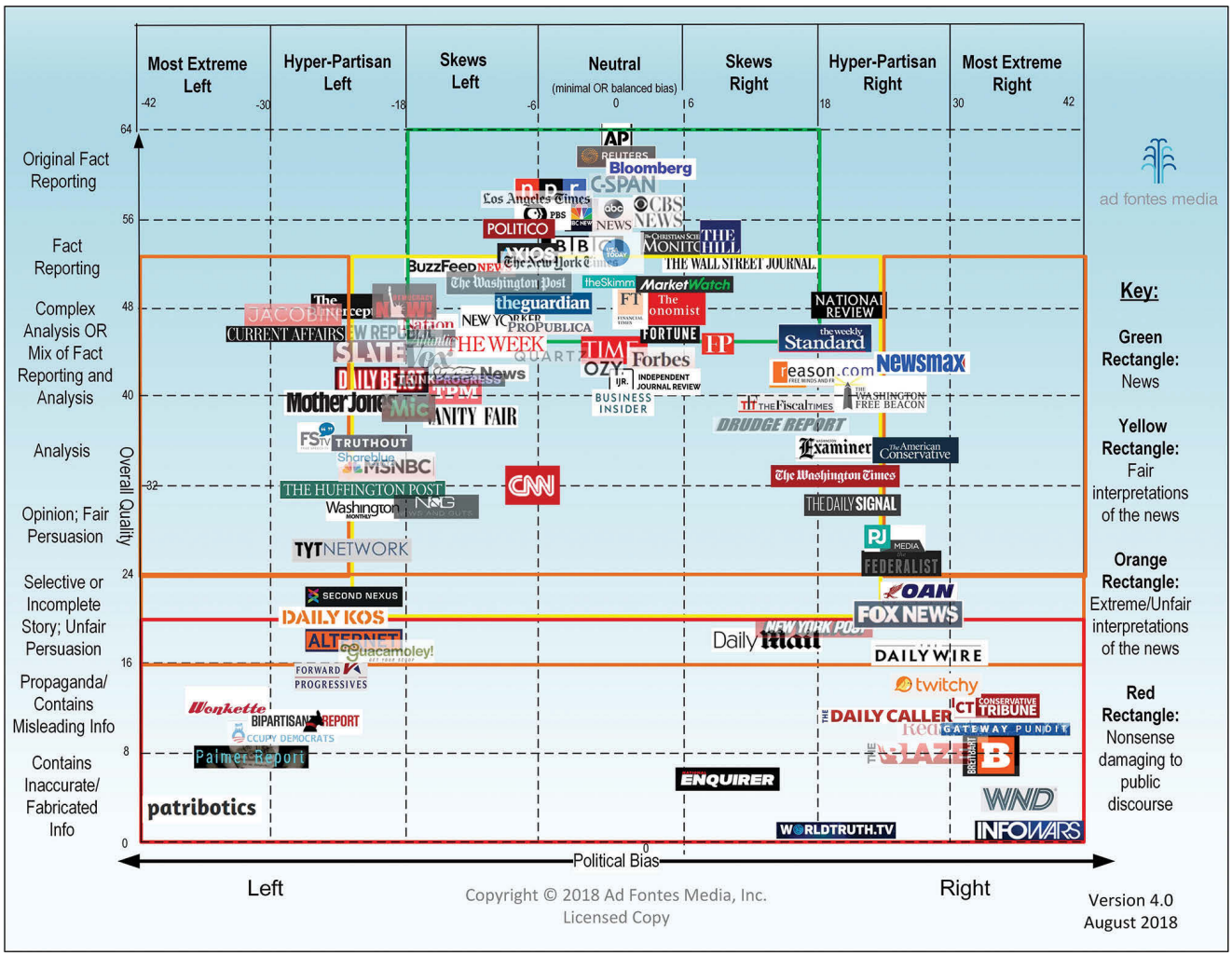

Figure 1. The 2018 version of the media bias chart by Ad Fontes Media, Inc. The vertical axis indicates level of fact-based reporting, and the horizontal axis plots liberal (left) versus conservative (right) bias. (Ad Fontes Media, 2018, used with permission.)

Biased Information Processing: Conservatives vs. Liberals

As the foregoing suggests, the media landscape is filled with politically biased information that spans a wide range of viewpoints, but how biased are the people who receive this information? When you ask Republicans or Democrats how biased people of each party are, you get predictable results: Democrats say Republicans are more biased, and Republicans say the reverse (see Figure 2). But psychological science cannot rely on the opinions of interested parties for answers. What happens when you put people in an experimental setting where they have a chance to act in a biased or unbiased way?

The study of political ideology has a long history in the field of psychology, and the division of U.S. politics into more hardened red and blue positions—which is also happening elsewhere in the world—has made this line of study more relevant. As a result, psychologists have learned a lot about what separates the two sides. John Jost and colleagues (2008), writing in *Perspectives on Psychological Science*, characterize the two sides this way: the *right-wing* label has come to represent political views that are conservative, supportive of the status quo, and hierarchical in nature, whereas *left-wing* views connote progressive social change and egalitarian ideals (127).

Jost and colleagues also found that

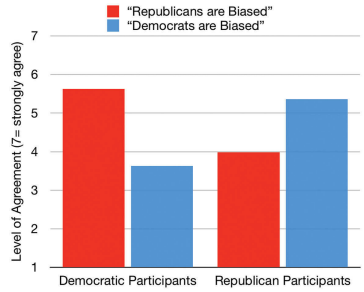

Figure 2. Mean level of agreement that the term *biased* accurately describes the average Republican or Democrat. Based on the responses of 951 Republicans and Democrats from Ditto et al. (2019a).

Table 1.

Conservatives have positive attitudes toward:	Liberals have positive attitudes toward:
Fraternities/sororities	Atheists
Religious people	Jazz
Sport utility vehicles	Asian food
Fishing	Libertarians
Alcohol	Tattoos
Prayer	Foreign films
Their fathers	Big cities

Table 1. Groups and activities that conservatives and liberals have more positive attitudes toward (from Jost et al. 2008).

conservatives were more likely to show "system-justifying attitudes," including support for the idea that economic systems are fair and that equality is undesirable. In addition, research has shown that conservatives and liberals can be separated by their attitudes toward various groups and activities. Table 1 shows a selection of these drawn from Jost et al. (2008).

Finally, recent psychological research suggests that these ideological differences are reflected in both explicit and implicit attitudes and are related to core personality dimensions (Jost et al. 2008). Currently, the most popular psychological theory of personality assumes that we possess stable traits that affect our behavior across time and environments. The most popular trait theory at the moment is The Big Five, which attempts to characterize people by measuring their levels of five traits: openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism (McCrae and Costa 1987). Research on political ideology has shown that liberals and conservatives can be distinguished by the degree to which they show two of the Big Five traits: openness to experience (higher among liberals) and conscientiousness (higher among conservatives) (Jost et al. 2008).

Given their relative openness to experience, it would be reasonable to think that liberals would be less biased than conservatives. When confronted with data that challenges their beliefs, liberals might be more willing to accept contrary information, whereas conservatives' propensity to defend the status quo would make them resistant to new information. A recent meta-analysis by Ditto and colleagues (2019a) suggests otherwise. The researchers summarized studies in which participants were presented with information that contradicted their beliefs and found that liberals and conservatives were equally biased in their acceptance of this discrepant data. For example, Dan Kahan of Yale University conducted a study (Kahan 2013) using a large sample of people who were scientifically matched to the demographics of the United States. Participants reported their political orientations and were asked to take the Cognitive Reflection Test (CRT; Frederick 2005), which consists of the three questions below:

1. A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost? _____ cents

2. If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets? _____ minutes

3. In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake? _____ days

The CRT is a mentally challenging task that is thought to require thoughtful, deliberate reasoning if you hope to answer the questions correctly. In the language of dual processing theory (Kahneman 2011), the CRT can only be mastered by engaging the slower but more powerful machinery of System 2 and cannot be solved using the simple intuitive heuristics of System 1. (By the way, the answers to the CRT are five cents, five minutes, and forty-seven days.)

In Kahan's study, the discrepant information given to participants was about climate change and scores on the CRT. Some participants were told that research showed people who "accept evidence of climate change" tended to get more answers correct on the CRT (discrepant for conservatives). Others were told that people who "reject evidence of climate change" got more answers correct (discrepant for liberals). After receiving this information, participants were asked to rate their agreement with the view that the CRT "supplies good evidence of how reflective and open-minded someone is" (Kahan 2013, 412). Kahan found that both liberals and conservatives were biased in their evaluation of the CRT. When told it correlated with an opposing point of view—climate change deniers for liberals and climate change accepters for conservatives—each downgraded their rating of the validity of the CRT. Kahan's study was one of fifty-one similar experiments summarized in the meta-analysis by Ditto and colleagues. Writing in the March 2019 issue of *Perspectives on Psychological Science*, Ditto et al. (2019a) suggest that Kahan's findings are representative of similar studies that looked at the biases of liberals and conservatives. When confronted with information that challenges their beliefs, both sides show equivalent levels of bias.

Well, that should be a comforting thought. If we can't get rid of bias, perhaps it is best that it be evenly distributed across both ends of the political spectrum. Not so fast.

The Ditto et al. (2019a) meta-analysis was challenged by a paper published in the same issue of *Perspectives in Psychological Science* by Jonathan Baron of the University of Pennsylvania and John Jost of New York University. On a general level, Baron and Jost (2019) pointed to a body of research showing that conservatives exhibit thinking styles that are substantially higher in dogmatism, rigidity, intolerance for ambiguity, need for closure, and order; whereas liberals

show thinking styles higher in integrative complexity, cognitive reflection, and need for cognition, which involves having a positive attitude toward tasks that require reasoning. This pattern of thinking styles is inconsistent with symmetrical bias for conservatives and liberals.

One of Baron and Jost's (2019) criticisms was that the original 1,500 studies from which the fifty-one studies used in the meta-analysis were drawn would likely have been designed to avoid a strong bias in one direction or another. If such a bias actually existed—in either a liberal or conservative direction—it would be difficult to find it with this group of studies. In a response, Ditto et al. (2019b) were quick to defend their methods of choosing studies for their analysis. But Baron and Jost made another criticism that—to me, at least—is worthy of serious consideration.

Baron and Jost (2019) point out that many of the issues used to assess partisan bias in the Ditto et al. study don't really have two sides. For example, the Kahan study described above was about climate change. The scientific community overwhelmingly supports the idea that human activity contributes to global warming, and as a result it is completely rational to be biased against information that contradicts that view. Baron and Jost argue that Ditto and colleagues have created a false equivalency. In many of the issues addressed in the meta-analysis, it would have been objectively appropriate to be skeptical. Baron and Jost made this point in a quote they used as an epigram for their article:

> There can be no real quarrel with a willingness to infer that studies supporting one's theory-based expectations are more probative than … studies that contradict one's expectations. … Hence, [a] physicist would be "biased," but appropriately so, if a new procedure for evaluating the speed of light were accepted if it gave the "right answer" but rejected if it gave the "wrong answer." The same bias leads most of us to be skeptical about reports of miraculous virgin births or herbal cures for cancer. (Lord et al. 1979, 2106)

It is reasonable to be skeptical of information that contradicts your background knowledge on the subject—particularly if you know what you're talking about. According to Baron and Jost, because the Ditto et al. meta-analysis did not measure or consider the participants' knowledge of the topics addressed, it is impossible to know how much of their bias was justifiable and rational and how much was sheer politically based prejudice. On some topics, Republicans may have greater background knowledge than Democrats (e.g., economics), but as a general trend, current political history contradicts the proposition of symmetrical amounts of knowledge among the political parties. Research shows that "low-information voters" were an important component of Trump's support. For example, a 2017 study found that voters who were low on need for cognition and low on political knowledge showed a greater preference for Trump over Clinton in the context of the 2016 presidential campaign (Fording and Schram 2017). If liberals in the Ditto et al. meta-analysis had more knowledge of the issues used to assess bias, then they may have been behaving more reasonably and justifiably than conservatives. But, at this point, we are not in a position to answer that question.

So, Who *Is* More Biased?

Perhaps the most honest answer is we don't know. The debate between Ditto and colleagues (2019a; 2019b) and Baron and Jost (2019) has revealed some sticky problems that need to be solved before we can make a clear judgment on the matter. Furthermore, the entire enterprise may be a bit misguided—just another opportunity for finger-pointing. Rather than focusing on the contentious and fraught issue of political bias, it might be more useful to highlight people's relative allegiance to facts. The word *bias* sounds uniformly bad, but preferring certain kinds of information over others—based on the source and on the quality of one's personal knowledge—is entirely appropriate, if not essential. In a world awash in misinformation (see Figure 1), it is important we learn as much as possible about the issues of the day and think intelligently and critically about the claims that come our way. There is ignorance on all sides, and intelligence and critical thinking should not be a partisan matter. ■

Acknowledgment

Thanks to Peter Ditto for providing the data required to produce Figure 2.

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DNA Is Not Destiny: Challenging the Hype over Genetic Testing

"Genetic Code of Human Life Cracked by Scientists" was the June 27, 2000, front-page headline of *The New York Times*. The previous day, in an event held at the White House, President Bill Clinton was joined by Francis Collins, director of the National Human Genome Project, and Craig Venter, president of Celera Genomics, to announce that the public-private consortium had successfully mapped roughly 90 percent of the human genome. "Today, we are learning the language in which God created life," declared President Clinton, flanked by the two scientists. "With this profound new knowledge, humankind is on the verge of gaining immense, new power to heal" (Wade 2000).

Even though full completion of the genome map was still several years away, in a 1999 article in the *New England Journal of Medicine*, Collins (1999) sketched out his vision for the health benefits, presenting a hypothetical scenario a decade in the future. He described a twenty-three-year-old male patient who, after meeting with his doctor, consented to a genetic test. Based on the results, the patient was told that he had an increased risk of contracting coronary artery disease, colon cancer, and lung cancer.

The test results, in Collins's telling, were used to prescribe an individually tailored prophylactic drug regimen to reduce the patient's cholesterol level and heart disease risk to normal levels. But most important, "Confronted with the reality of his own genetic data, [the patient] arrives at that crucial 'teachable moment' when a lifelong change in health-related behavior, focused on reducing specific risks, is possible," wrote Collins. In this scenario, the patient planned to begin annual colonoscopies at age forty-five and join a support group of other individuals at high risk of lung cancer, in a determined effort to quit smoking.

Taking their cue from government and the private sector, journalists during the 2000s portrayed genetic research in sensationalistic terms telling readers that the genetics "revolution" was *happening right now*. Headlines and cover stories proclaimed a gene for a myriad of human traits or behaviors such as the "fat gene," "laziness gene," and the "God gene." Other hyperbolic stories sold readers on the belief that genes were fate with headlines such as "Marriage Problems: It May Be in Your Genes," "Always Lost? It May Be in Your Genes," and "Party Animal? It May Be in Your Genes."

Such narratives falsely promoted the idea that genes *determine* health, attractiveness, personality, happiness, success, and personal failings. In doing so, the trajectory of life is framed strongly in terms of an individual's genetic destiny, downplaying the relevance of a complicated mix of social and behavioral factors.

By 2012, the cost of sequencing an entire individual's human genome had gone from several billion to a thousand dollars. Even cheaper and faster were new services offered by direct-to-consumer genetic testing companies. Instead of sequencing an individual's entire genome, these companies offer consumers the opportunity to search for genetic markers of traits and diseases.

Today there are an estimated 246 companies in the United States offering direct-to-consumer genetic tests. These companies market services that provide allegedly reliable information about disease risk, ancestry, athletic ability, child talent, nutrition, and even personalized beauty creams, compositional music, romantic partners, and wine varieties. Any consumer with approximately $200 to

spend can purchase a genetic test online, receive the test by mail, personally collect and mail back the DNA sample, and access the results online. Even dogs can be genetically tested for their "wellness needs" (Phillips 2016).

The growing popularity of personal genetic testing, warns bioethicist Timothy Caulfield in his 2012 book *The Cure for Everything*, is a consequence of a deeply problematic "cycle of hype" in science that has intensified over the past three decades. In the quest for prestige, funding, and profit, researchers and their institutions too often have sacrificed complexity, uncertainty, and truth.

Caulfield, who spoke at CSICon 2018, argues that this cycle stems from the immense pressure on universities and government agencies to demonstrate societal benefits and commercial value for their publicly funded research. This pressure results in over-promising in grant proposals and over-selling in research articles and news releases. Such messages are picked up by journalists, some of whom further twist them to add drama, gain attention, and spread across social media. Private companies amplify the hype, employing narratives often originating with researchers and the news media as further grist for their marketing mill.

What this adds up to, Caulfield tells viewers in a recent episode of his Netflix series *A Users Guide to Cheating Death*, is that "our perception of genetics is light-years ahead of what is currently achievable." Genetic testing feeds on a consumer economy that is increasingly tailored toward making every experience or product deeply personalized. But Caulfield warns viewers that we should be deeply skeptical of claims that "we can use genetic information to tailor these really complex human traits that have lots of genes involved, experiences, memories" that combine in unknowable ways to influence our lives.

Dubious Promises

Among all the genetic testing applications, it is detection of disease risks that Caulfield and other experts warn is the most problematic. More than 130 companies currently offer health risk–related genetic testing (Phillips 2016). But such tests are of dubious value. Researchers have yet to uncover genes that provide highly predictive information about the probability of common diseases such as heart disease, diabetes, and most cancers. These diseases have complicated, multiple genetic links that interact strongly with personal environment, lifestyle, and behavior. The exceptions are a handful of rare diseases that are directly caused by a specific, single-gene mutation such as Huntington's disease or cystic fibrosis. In this category, the best-known genetic testing "success" story is the identification of the BRCA 1 and BRCA 2 mutations, which are present in less than 1 percent of the population and can dramatically increase the chances in some individuals of breast and ovarian cancer.

Any consumer with approximately $200 to spend can purchase a genetic test online. Even dogs can be genetically tested for their "wellness needs."

Despite the uncertainties specific to common diseases, genetic testing companies heavily promote their ability to provide information about our health future. When Caulfield, for example, tested his DNA, the results he received indicated that he had a 0.4 percent chance of developing celiac disease compared to the 0.1 percent population risk. He also had a 0.5 percent chance of developing multiple sclerosis (MS) compared to the 0.3 percent population risk, according to the company's estimates. But when placed in perspective, in comparison to the risks presented by driving, sun exposure, smoking, drinking, or obesity, Caulfield's 0.2 percent greater risk of developing MS was "essentially lost in the wash of risks associated with life," he noted.

The need to place genetic test results in context is a second major problem with direct-to-consumer services. Few individuals have the expert knowledge to reach the type of interpretations pre-

sented by Caulfield. If ordered by a doctor or genetic counselor by way of a local hospital or lab, a patient would be able to review the results with a qualified professional who can provide guidance on how to interpret and manage the risks—if management was needed at all.

But when an individual orders a genetic test from a company and receives the results online, they are left to rely on their own knowledge to interpret, cope with, and act on the results. As a consequence, an individual may develop a misguided, fatalistic attitude. They may become depressed, holding a false certainty that they are likely to develop a serious disease, a belief that can affect every other part of their life. Or if they erroneously believe they are bound to develop heart disease or obesity, the patient may reason they might as well live it up and eat anything they want, stop exercising, and so on. The lack of available professional guidance and counseling is all the more serious when prospective parents obtain direct-to-consumer tests evaluating the risks of any future children being affected by a serious illness or disability (Phillips 2016).

Pressure to demonstrate societal benefits and commercial value results in over-promising in grant proposals and over-selling in research articles and news releases.

In any genetic test, privacy and informed consent are also a major concern, especially in light of recent revelations about illicit sharing of data among major social media companies. Similar to joining a social media platform such as Facebook, most genetic testing companies offer consumers a lengthy, online "clickwrap" contract that is easily skimmed, if read at all, calling into question whether adequate informed consent is obtained from consumers or if they are even aware of how their personal genetic information is being stored, shared, and used. These questions deeply matter because the business model of most genetic testing companies is premised on a Silicon Valley–inspired model considering human genetic information "digital big data to be browsed, uploaded and shared by consumers and companies online," write sociologists Stuart Hogarth and Paula Saukko (2017).

Finally, the main pitch made by genetic companies—that if an individual is aware of their genetic risk for disease, they will take action by adopting a healthier lifestyle—is a false one. As Caulfield (2012) details, patients rarely change their lifestyle based on adverse weight, cholesterol, or glucose levels, measures that in most cases are far better predictors of related disease outcomes than current genetic tests can provide. Even when patients suffer a heart attack or undergo bypass surgery or angioplasty, only about a third of patients follow doctors' recommendations by continuing with an exercise regimen a year after the event.

Perhaps not surprisingly, a meta-analysis overseen by the esteemed Cochrane Review Group of available studies on the effects of genetic risk information warns:

> Expectations that communicating DNA based risk estimates changes behaviour is not supported by existing evidence. These results do not support use of genetic testing or the search for risk-conferring gene variants for common complex diseases on the basis that they motivate risk-reducing behavior. (Hollands et al. 2016)

Many of the companies that offer disease risk information also sell testing specific to ancestry, an option that is gaining in popularity. When a person receives unexpected information about their ancestry, writes Phillips (2016), it can often have profound effects on conceptions of self-identity in ways that twist and confuse differences between race, culture, and myriad other factors. Tests specific to Native American or African American ancestry are also increasingly popular. But genetic testing companies rely on databases constructed by past consumers of their services, making the pool of genetic information by which to offer scientifically valid results related to racial minority groups questionable. For example, among past consumers on file at one of the largest private databases, less than 1 percent had identified as Native American and less than 3 percent as African American (Phillips 2016).

Writes Caulfield in *The Cure for Everything*:

> Where is this [genetic] revolution happening? Not in the world in which I live in. … The so-called genetic revolution is more of an uncertain and slow evolution. There are vast amounts of genetic information at our disposal, and incomprehensibly sophisticated technologies that allow the speedy production of more and more of it, but scientists and researchers still appear to be nibbling indecisively around the edges of all that data, unsure what to do with it. ■

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[SKEPTICAL INQUIREE BENJAMIN RADFORD

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Anomaly Hunting with Satellite Images

Q: I'm curious as to what you think these two images could be of. They are screenshots I took from Google Earth and are off the coast of Borneo.

—V. Corbett

A: We can begin with what they're *least* likely to be: something mysterious, such as a sea serpent or top-secret experimental snakelike submarine. It's difficult to tell without a scale—and we shouldn't necessarily assume that the two images are of the same type of thing—but a boat or watercraft wake seems likely, especially because of the varied width of the trails. That's of course a signature of airplane contrails and boat wakes; anything on the surface of a fluid will typically be widest toward its geographical origin and narrower where most recently made.

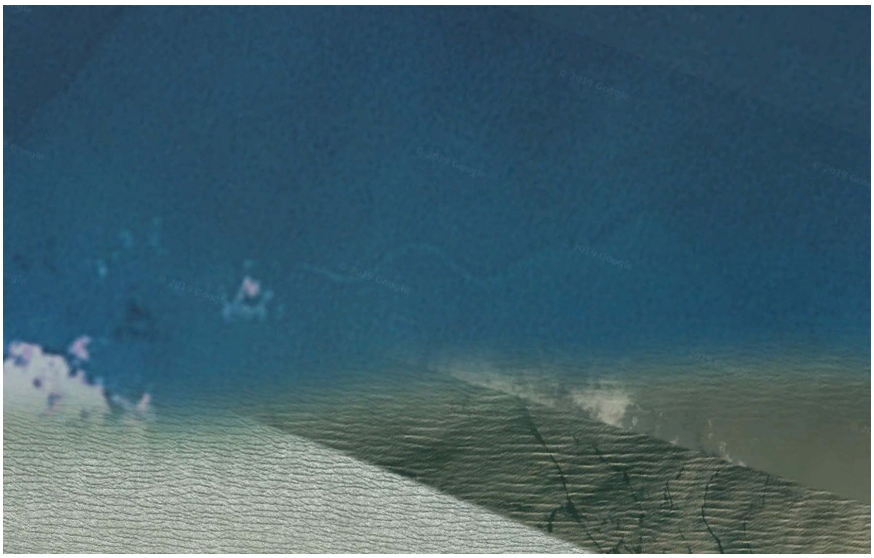


Figure 1. One of two seemingly mysterious marine images discovered on Google Earth.

It's unlikely to be underwater piping, which is used to transport liquid or gas from Point A to Point B, because although the piping may curve around terrain, it doesn't typically go in circles (by contrast, Jet Ski riders, for example, often make wide turns and loops as seen in Figure 2). Another possibility is commercial fishing nets. The fact that the images are in the tropics and near the coast—where water sport tourism and fishing are common—may be significant; the same images taken in the middle of the South Atlantic, for example, would likely have a different origin.

This is only one of many such "mysterious" images. A 2014 satellite photograph had many people wondering whether the elusive Loch Ness monster might finally have been photographed from space. The image seemed to show a strange, ghostly oval shape with trailing white tendrils either on the surface or just below the surface of Scotland's famous Loch Ness (Figure 3). The images had been taken years earlier but resurfaced when the story was picked up by British tabloids.

Monster fans debated the new evidence, but soon several websites debunked the "Nessie" photo, including Sharon Hill's DoubtfulNews.com and Mick West's Metabunk.org, which offered clear explanations for the image. The conclusion: the image of the Loch Ness Monster was ... an ordinary boat wake. In fact, the distinctive wake pattern exactly matches that created by other boats, both on Ness and other lakes. The satellite image is not a single photograph, as many apparently assumed, but instead a composite of several different images, each with a different contrast; this helped create the illusion of a creature.

Why Satellite Images Mislead

While early proclamations of Nessie having been found by a satellite caused some red faces, we shouldn't be too quick to judge those who saw a monster where none existed. The idea that a satellite could capture an image of

a giant monster is not necessarily far-fetched. Many lake monsters and sea serpents are reported to be fifty feet or longer. If armchair investigators are up to the task, they could monitor reputedly monster-inhabited lakes such as Scotland's Ness, Canada's Lake Okanagan, and America's Lake Champlain using satellite technology. Monster buffs don't need to dip their toes into cold lakes or brave the wilderness to search for their quarry; they can scan a dozen square miles over a cup of hot coffee at their leisure.

In their 2007 book *Remote Sensing and Image Interpretation*, authors Thomas Lillesand, Ralph Kiefer, and Jonathan Chipman explain why satellite images can easily mislead the public:

> Although most individuals have had substantial experience in interpreting "conventional" photographs in their daily lives, the interpretation of aerial and space images often departs from everyday image interpretation in three important aspects: 1) the portrayal of features from an overhead, often unfamiliar, perspective; 2) the frequent use of wavelengths outside of the visible portion of the spectrum; and 3) the depiction of the Earth's surface at unfamiliar scales and resolutions.

Strange satellite images have caused controversy and consternation before. In 2011, people reviewing images on Google Maps spotted a tangle of mysterious, connected white lines in the Chinese desert. The strange images spurred a furor on the internet, where amateur sleuths offered learned—and not-so-learned—opinions about their function, ranging from UFO landing strips to top-secret military bunkers. The lines were eventually identified as a grid used to calibrate Chinese spy satellites.

As satellite images become more common, these sorts of "mysterious" photographs will also likely become more common unless the public becomes more educated about satellite imagery. After all, only photographs that are ambiguous and mysterious enough will come to the public's attention. If a photograph is crystal clear and unambiguous, no one will pay attention to it, because its identity is obvious. On the other hand, if a photograph is too ambiguous, it is likely to be ignored or deleted as an obvious mistake of such poor quality that it's worthless; it's the same reason we don't see the worst photos that people take with their smartphones—they're soon deleted. From ghosts to Bigfoot, for an image to be "mysterious" it needs to fall into that Goldilocks zone of being just clear enough to give an idea of what it might be but not clear enough to actually tell what it is.

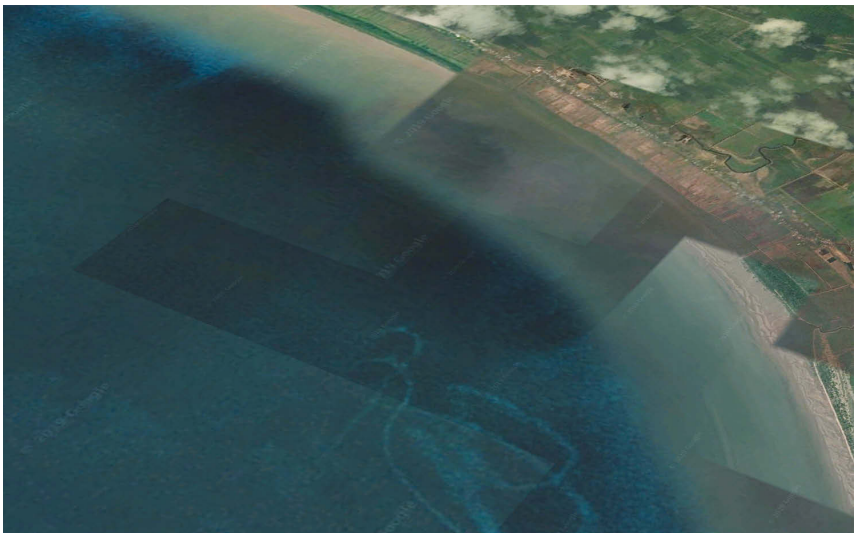


Figure 2. One of two seemingly mysterious marine images discovered on Google Earth.

A 2014 satellite photograph had many people wondering whether the elusive Loch Ness monster might finally have been photographed from space.

Figure 3. A curious-looking boat wake mistaken for a marine monster—in Loch Ness, Scotland.

The images discussed here were the result of anomaly hunting, or basically perusing or scouring a data set (hundreds of photographs of a supposedly haunted church, for example, or terrestrial features on satellite images), until noticing that one or more looks odd for some reason. As I discussed in my books and previous columns (e.g., Skeptical Inquirer May/June 2011), anomaly hunting is a very poor investigation technique; it is not particularly useful in solving mysteries and is in fact usually counterproductive. That's because scientific paranormal investigation begins with a specific claim (e.g., "A ghost in my house throws plates at me" or "My Elvis statue is weeping bloody tears"), which is then closely analyzed. Anomaly hunting reverses this process, essentially putting the investigator in the position of needlessly generating spurious new claims.

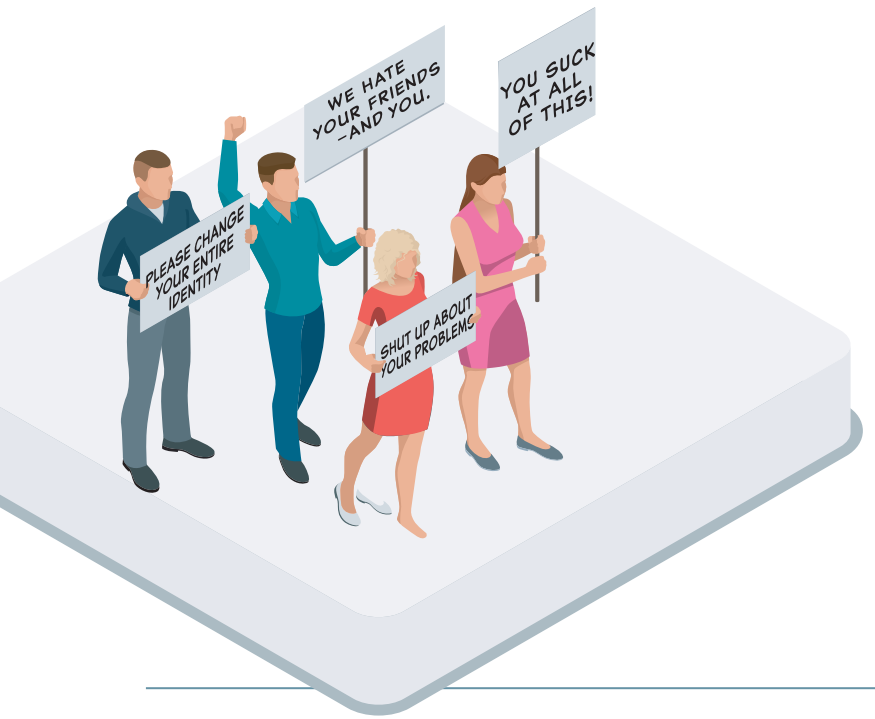
It's the classic fallacy of arguing from ignorance (or personal incredulity): "I don't understand X, therefore it's an anomaly." Without access to far higher resolution images, it's difficult or impossible to conclusively identify what one or both of these images are, but as is often the case, the most likely explanations are also the most mundane. ■

Building Better Science Activists

with Insights from Disney, Marketing, and Psychological Research

TROY H. CAMPBELL

Team Science is fighting a very odd war. It is won only when most people we see as "against us" voluntarily choose to join us. Here are ideas on how to get more people to join us, drawing from the worlds of marketing, my previous employer Disney, and psychological science.



Let me start with a secret: although I am a scientist, in my life I have denied, ignored, and generally resisted a lot of science.

In high school, I denied science when a doctor diagnosed me with hypoglycemia. I did it because I simply wanted to keep drinking that sugary Starbucks Frappuccino.

In college, I was unmoved by science when I took a class with a Nobel Prize–winning climate change scientist. In this case, I believed the expert's scientific evidence, but I failed to start behaving more environmentally.

With my hypoglycemia, only when the doctor caringly reassured me that my diet would be tasty and "cool enough" did I start letting myself believe I had a scientifically identified problem.

And regarding the environment, I did change my behavior but not until years later when I met an attractive British geologist. She was environmental and had a great accent, so I became environmental. It was as simple and shameless as that.

When the geologist came over for a first date, she asked me where the recycling bin was. So I turned a cardboard box of notes into a bin with the line, "I just have a cardboard box because as that triangle says 'reuse before recycle.'"

Being aware or educated did not change me. Even though I knew "that triangle," even though I had heard about climate change for *over ten years*, and even though I had taken a *ten-week course* with a climate expert, I had yet to change. But *just ten minutes* into a first date with a hot geologist, I was an environmentalist.

We Need This Marketing Stuff

This article does not ask Team Science to forgive or condone people who are like me. Nor does it say that we should stop with more aggressive tactics. Those are important and should remain. This article is simply about getting more people onto Team Science.

In this article, I want to put into laser clarity: Team Science will lose if we don't deal with the basic human forces that lead to resistance. Thus to win, we need to borrow more techniques from Disney and marketing.

I am Troy Campbell, a designer, former Disney Imagineer, social psychology researcher, and professor of marketing at the University of Oregon. In an ideal world, a marketing professor would not be writing an article in a science magazine. But we don't live in an ideal world; we live in this very unideal one, so here I am.

So if you need, take a moment to vent and scream, "This is stupid!"; "People should just listen to the facts!"; or "Dammit, Jim. I'm scientist, not a marketer!" Go for it. I'll wait.

Alright, did you get that out of your system? Good. Let's begin.

Do It Like Disney

Think of science as having the best facts, just as Disney has the best theme park rides. Both science and Disney might be tempted to stop there and just put up a sign that says, "We are the best. Come over here." But the secret to Disney's success is that Disney knows having the best rides is not enough.

Disney and marketers think about the three general forces of *the solution*, *the self*, and *the social*. So in the rest of the article, we will start each section with how Disney channels one of these forces, review a few psychology experiments, and then see how science activism can better play with these powerful forces.

We will start with the basic stuff and then get to the truly invisible "Oh my god! Disney is affecting my psychology that way!" type of things that will make you think, "If we could get people to connect with science even at one-tenth of the way they do with Disney, we could actually save the world."

The Solution Force

A basic place to start is the massive amount of effort Disney puts into making its lines as fun as possible. One might think, "Who cares? If Space Mountain is at the end of that line, why bother making the line more enjoyable?" The answer: because Disney knows that even the paths or the "solutions" to the most desirable things, such as the Space Mountain and Indiana Jones rides, need also be desirable or at least not that aversive.

Team Science will lose if we don't deal with the basic human forces that lead to resistance.

The analog for us scientists is that even the paths or the "solutions" to the most desirable things in the world, such as good personal health and a safe climate, need also be desirable or at least not that aversive. Activists miss this insight often when they think, "Who cares? If a safe climate in the future is at the end of a line of hard work, why bother making that hard work more enjoyable?"

My colleague Aaron Kay and I explored this overlooked problem of solutions (Campbell and Kay 2014). In a phenomenon we call "solution aversion," we found that people have a tendency to resist or even deny a problem when they do not like the solution to the problem. For example, we found people are more likely to deny an environmental problem exists if they personally dislike the proposed policy solution to the problem.

Though some science folks overlook the solution force, others do intuit it sometimes. My doctor did when he immediately identified and managed the solution aversion in teenage me. He saw I was denying my diagnosis of hypoglycemia because I wanted to keep consuming things such as that cool, sugary Frappuc-

Tips for Effective Activism

Don't Start with Calculus

Some activists foolishly try to teach the public advanced science before the public even knows the basics and accuse any other activists doing anything else of "dumbing down" the science.

We Need Every Strategy

Sometimes we need to shame people and shut down freeways in angry protest. But sometimes we just need to hug super-polluting-racists and think about their psychology. It's complicated.

Psychology Must Be a Core Part of Education

Psychology is simply the skill to understand yourself and others. It may be the most important skill a person could ever learn. Yet in our education system, it is at best an elective.

Book Smart vs. Street Effective

Our education system is producing students who can write an A+ science or social justice paper but have no ability to persuade anybody other than their professor that their ideas are worth considering.

Avoid Solution Aversion When Possible

Very few people stick to a diet they hate. Very few people will help a cause that feels miserable to help or learn about, especially if they don't have a supportive friend with them.

Rally, Rally, Change

Exposure labs often screen the same environmental documentary three times in the same community. The first screening rallies out the deep choir; the second screening rallies people similar to the choir; the third screening brings out friends of friends of the choir—and that's where they say they often see the real belief and behavior change.

cino. When Kay and I published "solution aversion," so many people gained clarity from our experiments and theory that they filled Twitter, Reddit, and comment sections with their own examples, rocketing "solution aversion" to the most viewed research press release in Duke University history.

And so while the solution force is slightly hidden, there is some understanding. It is really when we get to the next two forces that we start to see the hidden magic that Disney wields, which by comparison is often completely absent in activism.

The Self Force

Disney knows that to have the most successful theme parks in the world it needs to have the best rides and fun lines, but maybe just as important, it needs to convince you that you are the type of person who wants to get in that line and get on that ride. In short, it needs to appeal to your deep sense of self.

In their "Show Your Disney Side" campaign, Disney hit the self-force hard by showing how you already love Disney in some inner way, and, thus, you need to go to the parks to express that. The effective message reads, "Disney isn't just awesome; Disney is who you are."

Here, Disney follows the marketing tactic of simply telling people that they already are the people Disney wants them to be. This works well because, as humans, we tend to choose items that are consistent with our sense of self (Swann 1997), that we feel we already are talented at (Campbell and Ariely 2015), and that seem to have some idiosyncratic fit with us (Kivetz and Simonson 2003).

Disney knows this, so instead of saying, "You should come to Disney," or "You should be a Disney person," they simply say something like, "You are a Disney person." They make ads with familiar references and identity-compatible moments to show you that Disney is part of the true you. So of all the possible choices you could make with how to spend your money, spending

Disney and marketers think about the three general forces of the solution, the self, and the social.

it on Disney feels like the authentic, correct choice. If Disney *is who you are*, why would you spend your money any other way?

Lots of activist movements push the button in the opposite direction. These activist movements more or less say to outsiders, "Hey, assholes, you suck at this, so you need to change your entire sense of self and get good at this thing that has nothing to do with you." And, for good measure, they usually add in a, "Forget your favorite celebrity role models; they are immoral trash."

No one likes to play a game they are the worst at, especially a game they get scolded for being bad at. For instance, if you are not good at playing or understanding soccer, you don't play or watch soccer. Even worse, you might go further and degrade the very value of the sport of soccer. Now substitute the word *soccer* with *science* and see how science activism often can undermine itself.

Now, some of this "Hey, asshole! You suck" approach is necessary sometimes. If handled properly, this type of confrontational approach can work, but often it does not, partly because it also threatens the last and possibly most important force.

The Social Force

In my class I often like to say, "The greatest influence on people is other people." While that might be an exaggeration, it is not far off. The social force is extremely powerful (Cialdini and Goldstein 2004). In understanding the social force, we can practically reduce it down to two questions: "Are my friends doing this?" and "What will the people in charge think of me?"

Turning once more to Disney, we see the "Are my friends doing this?" question answered, from the way the new Disney rides and experiences encourage social interaction, to lots of group photo ops, to an unending number of *Avengers*-style team metaphors, to the so, so, so many viral social media campaigns of your friends at Disney events showing their "Disney side." These are complete with Disney filters, Disney products, and the encouragement to post things such as "Which Disney princess are you?" quiz results.

You are constantly reminded, through everything from commercials to your Facebook feed, that your friends are Disney fans. So, even if you dislike most of Disney's intellectual property, you still want to learn about it and want to like it because it is a way you can connect with your friends' passions.

Further, with the question of "What will the people in charge think of me?," Disney tries to create a caring environment, at least for those who can afford the admission tickets. Disney attempts to welcome all by saying that everyone has a "Disney side."

We Must Empathize with the 'Enemy'

Empathy is a skill that is necessary when trying to change minds. Empathy or perspective-taking does not mean you are being sympathetic to or condoning the bad actions of those with whom you are empathizing.

Flight from Fact

People resist science in many ways other than straightforward denial of fact. For instance, they may alter their belief structures such that their beliefs (or at least stated beliefs) are less accountable to a specific fact or to any falsifiable information (Friesen et al. 2015). They may say things such as "That just can't be proven"; "This is more of a moral thing than a fact thing"; or "That doesn't mean we should do anything about it." Thus, even if you can convince someone of a fact, it may not alter the ultimate higher-level belief.

Lies Are Signals

If a few people in the bleachers yelled, "They fouled her!" or "He did have the biggest inauguration!" when the truth is obviously otherwise, then you would be damn sure which team they supported. And if you were looking to sit with highly committed members of that team, after that one single lie, you'd know with whom to sit. Lies can send a signal of what team you are on, and because team and tribalism are important, lies have a social function that can sometimes be rewarded.

Antiscience Is a Problematic Label

A survey of self-described science lovers would include a few engineers who deny cimate change and a few environmental advocates who are anti-vax. Calling these people wholistically "antiscience" is not only not a great persuasion strategy, it is also not fully factually correct. Remember, almost anyone on Team Science has isolated pockets of science denial or misperceptions.

Disney also constantly throws out that famous Walt Disney quote, "Disneyland will never be completed. It will continue to grow as long as there is imagination left in the world," suggesting that you don't *just* have a "Disney side"; by going to Disneyland, you are actually *maintaining* and *creating* Disneyland through your imagination. Now that is a welcoming message.

So by thinking about how Disney positions itself in terms of "People like you do this," and "We, the people in charge, like you," we can think about different attracting and repelling versions of the social forces in activism.

For the attracting forces, it can be as simple as: if my friends or people I want to be friends with are doing this, then I should do it too. Though it sounds stupid, pro-gay filters on all your friends' Facebook profile pictures, activist hashtags, and celebrity Instagram posts can be powerful forces for change through the "Are my friends doing this?" function. Public campaigns that indicate most people like you follow an environmental conservation norm (e.g., use limited water or energy) or are changing to be more environmental can be largely influential as well.

When you do *not* start with care, it often leads people to assume a level of hostility about you that is *not* true.

For repelling forces, the thought process can be: my friends won't accept me if I get involved with this, so I won't get involved. This is why, for all the backlash against them, there are some positive things about campaigns such as Gillette's anti-toxic masculinity campaign, "The Best Men Can Be." These campaigns have at least the potential to create a social norm. For example, the Gillette ad made it seem like gender equality is an important issue with normal beer-drinking, grilling, shaving men.

Once again, in an ideal world we would not need razor ads to help with social justice, but we live in a very unideal world. And in this unideal world, things such as imperfect ads are needed in the nuanced equation toward a better society.

One other way people might be repelled by activism is by the feeling that Team Hero will not accept them. That is, they fear the judgment of the scientists and activists behind the bullhorn. People may worry that even if they attempt to change their behavior, the activist elites will still be unaccepting of them because of some past behaviors, privileges, or other disqualifying attributes.

Though it may sound unsavory, good inclusion training often follows a "Welcome to Team Hero" logic, in which the idea is that everyone in the room (including many who are feeling very threatened) is described as already, or after the training, on the Team Hero of inclusion. Instead of leaving the room "trained," they leave the room as "advocates." Note to those cringing right now: yes, there is an amazing amount of nuance to getting this right, as well as situations in which this tactic is highly untruthful and inappropriate, but in many situations, it is worth considering and is backed by research (Dobbin and Kalev 2016).

Notably, many religions are great at recruiting people in ways other groups are not. Even if they might be mean to outsiders, they will immediately accept outsiders who want to be insiders along the lines of: "Congratulations! You confessed your sins; welcome to Team Christian! Here's the guidebook. It is called the Bible. Small group meets on Wednesday, and always remember Jesus loves you, and we do too." That common phraseology of "Jesus loves you, and we do too" is one hell of a "Welcome to Team Hero."

In practice, to get people on Team Hero, consider the ways people can feel part of a team quickly. Give them: 1) some expertise, such as teaching high-level inclusion habits that even many publically "woke" people don't have; 2) a "membership card" of sorts, or an "I was there" sou-

venir, similar to how sporting events give away exclusive T-shirts; or 3) a way to immediately contribute.

At some screenings of the 2012 documentary *Chasing Ice*, environmental advocates let newcomers have their photo taken with a message the newcomer personally wrote on a stylized poster, such as "Congressman, I am a big fan, but please change your vote on the environmental proposition." The advocates posted that photo-tweet from their own official account. "Welcome to Team Hero" indeed.

Lastly, "start with care."

If you want anyone to care about your critical message, you need to first demonstrate that you care about them. Our in-progress research shows that when advocates criticize others without expressing care for them, these others think they are seen as morally inferior and that advocates have little concern for them.

In different studies, we found that the majority of people who criticize the police for prejudice, a genre of music for perpetuating problematic stereotypes, or a political party also have strong concerns for the issues the police, songwriters of that genre of music, and those political party members face, respectively. Yet, other participants, including those from these criticized groups, greatly underestimate the amount of concern these criticizers have for their groups. So when you do *not* start with care, it often leads people to assume a level of hostility about you that is *not* true.

We found that messages that aim to persuade members of groups to accept criticism are more effective when the messages also convey that the messenger has some concern for the group they are accusing of wrongdoing. Showing concern for those we criticize may go a long way in promoting social change.

A lot of people may respond to this proposal to "start with care" by saying, "We should not have to go out of our way to be caring and nice to people, especially people who are not being caring and nice to us."

My well-calibrated response is: I agree. It is wrong that we have to do this. And it often puts far too much burden on certain messengers. They, themselves, might be victims of the problem. So we need to carefully choose when we employ this strategy and, especially, who we ask to engage in this strategy.

However, I have another response for certain privileged advocates, and it goes like this: "So, let me get this straight. You are willing to camp out for three weeks as part of a protest, and you are willing to spend over $3,000 of your own money to do so, but you are unwilling to take three minutes to remind the people you disagree with that you actually care about them in a strategic way that will help solve the problem you have repeatedly said is, quote, 'the single biggest problem of our time'? Just checking to make sure I understand."

Conclusion

In an ideal world, we would not have to take extra time to be nice to those who are ignorant, biased, or wrong. Yet in this unideal world, unideal solutions are necessary. These unideal solutions include things such as heavy protests, costly strikes, and putting up the middle finger, and yet sometimes it also includes opening your arms and being caring with your anti-vaccination aunt.

If you are being honest with yourself, if only for selfish reasons, you want a welcoming world like this to exist because, sometimes *you*, too, are ignorant, biased, and wrong about science. Today, you are less ignorant, biased, and wrong about certain scientific facts because someone who was not yelling at you helped you get there.

Maybe you got there because, first, someone yelled at you and really shook you up. But on that path to truth, someone with whom you wanted to be friends also came along with a "Welcome to Team Hero," a fix to your solution aversion, or a message that just "started with care." ■

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Troy H. Campbell is an academic with a designer's heart. He is a professor of marketing at the University of Oregon, a social psychologist by training, and an award-winning researcher in social change, identity, and experiential design. His professional credentials include Netflix, Disney, Apple, and United Health, the fandom firm Power Level Pro, and the artistic training firm On Your Feet. He spoke on this topic at CSICon 2018.

Conspiring for the Common Good

Why have conspiracy theories become more prevalent in our political discourse than at any other time in recent history? According to opinion polls, conspiracy theories on the whole are very popular in the United States, and social scientists are trying to understand why.

JOSEPH E. USCINSKI

I have been studying conspiracy theories for about ten years now. When I started, I did not expect that the topic would become as important as it has become, particularly from 2016 on. I would like to be able to say that I had the foresight to know that they would eventually come to dominate our political discourse, but I didn't. In fact, I expected the exact opposite: that conspiracy theories would continue on a downward trend of losing importance over time. The data a colleague of mine and I gathered suggested that the United States was on such a trajectory since the 1960s, but unfortunately that data collection effort ended in 2010 (Uscinski and Parent 2014).

I would also like to be able to say that I had the idea to study conspiracy theories myself. But, alas, I have to give the credit to my colleague for that. As a political scientist, conspiracy theories were well off the beaten path of political science ten years ago, and there hadn't been much research into them in other social science fields either. At the time, I wasn't even sure what we would study, exactly. This may sound ironic now, but I didn't think that conspiracy theories either affected or were affected by politics in any way. The only thought I had really given to conspiracy theories was in the early 1990s when the Oliver Stone movie *JFK* came out. So, when my friend and colleague Joseph Parent pitched me on the topic, I thought he was joking. I would have preferred to work together on something more mundane and was therefore inclined to turn him down. Looking back now from a career standpoint, it's a good thing I did not.

When I began to gather the existing literature on conspiracy theories, I found very little in the social sciences. There were a few articles here and there, but no major research agendas had ever been undertaken. In psychology, there was a budding agenda that had started around 2007: Karen Douglas and her team in the United Kingdom started to look into the phenomenon of belief in conspiracy theories and were beginning to publish some very insightful papers (Douglas and Sutton 2008). Most of the work was historical and cultural in nature, and much of it either followed in the footsteps of Richard Hofstadter's (1964) original take on conspiracy theories or was a response to it (Butter and Knight 2018). The lack of social science literature signaled a much bigger problem: there was not going to be any ready-made data for us to use.

To measure beliefs, one would typically use surveys. Some polls over the decades occasionally asked respondents about their belief in a conspiracy theory or two, but these questions were rarely repeated or asked consistently. Questions about belief in JFK conspiracy theories have been asked enough over time to get a feel for how many Americans believe that particular strand of theory, but that would only get us so far because to rely on that would be like relying on the stock price of General Motors to tell us about the performance of the stock market writ large. We wanted data "big" enough to generalize from. Our initial data collection effort took three years to complete and involved the analysis of 120,000 letters to the editor of *The New York Times* from 1890–2010. My assistants read all of the letters, looking for those that advocated or refuted a conspiracy theory, and then we coded those letters by who was being accused of conspiring. This was the first effort to capture the dynamics of conspiracy theories writ large over time in a systematic way. At the same time, we began an effort at national polling that I have continued.

As I analyzed the data, my initial thoughts about conspiracy theories began to seem very wrong. Conspiracy theories were not by any means a fringe phenomenon. They seemed to exist during all eras I studied and were believed by majorities of people. Further, there were numerous conspiracy theories that people had believed in at one time or another. Did you hear that Jimmy Carter was a Soviet puppet? Or that the CIA attempted to infiltrate the women's movement with undercover lesbian agents? Or that the planet is really run by an interdimensional race of interbreeding lizard people? We

all hear about the JFK, Birther, Truther, and moon landing conspiracy theories, but those are just the tip of a massive iceberg. I found—and continue to find—that there are countless conspiracy theories that people can concoct.

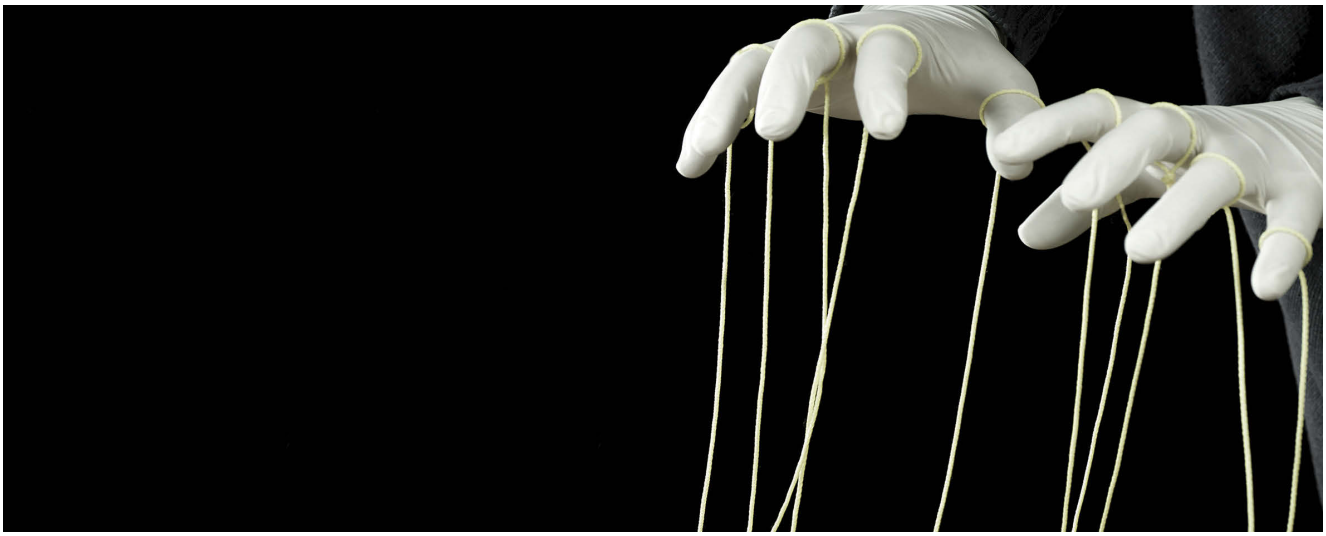
Polls strongly suggest that everyone believes one or a few conspiracy theories. For example, a national poll by Fairleigh Dickenson University asked about four conspiracy theories; 63 percent believed at least one (Cassino and Jenkins 2013). Political scientists Eric Oliver and Thomas Wood (2014) polled Americans about seven conspiracy theories and found that 55 percent believed in one or more. A representative poll of Florida asked about belief in nine conspiracy theories, finding that only 20 percent believed in none of them (Uscinski and Klofstad 2018b). A poll of New Jersey—a number of years ago—asked about belief in ten conspiracy theories, and only 6 percent of respondents believed in none (Goertzel 1994). Different polls ask about different conspiracy theories, but as polls ask about more conspiracy theories, the number of people who believe in none tends to decrease. Therefore, I don't think we can say that there is an "us" who resists all conspiracy theories and a "them" who succumbs. Certainly, some people believe in more conspiracy theories than others, but everybody partakes a little bit—even if they don't want to admit it.

The policy relevance of conspiracy theories was perhaps the most shocking thing to me as I have continued to study them. Conspiracy theories have erupted not just in presidential politics—suggesting that President George W. Bush blew up the Twin Towers on 9/11/2001 or that President Barack Obama faked his birth certificate to usurp the presidency—but also in policies as far ranging as local land-use laws, bicycle sharing programs, genetically modified food policies, and disease prevention plans (Avery 2017; Hurley and Walker 2004; Osher 2010; Harmon 2014). Conspiracy theories also drive people to bad personal decisions as well, particularly in the area of health (Jolley and Douglas 2014), and because of this, diseases once thought eradicated have come back (Plait 2013). Conspiracy theories continue to play a sizeable role in justifying inaction on climate change in the United States, and this may lead to planet-wide disaster (Uscinski et al. 2017). Further, conspiracy theories are not confined to the United States but rather affect politics and policy all over the world: think current politics in Poland (Soral et al. 2018), Russia (Yablokov 2018), Turkey (Nefes 2018), the Middle East (Nyhan and Zeitzoff 2018), Europe (Drochon 2018), and Latin America (Filer 2018).

The perennial question, therefore, is why do people believe conspiracy theories? One might think that conspiracy theorists—particularly the committed ones—have a psychopathology behind their beliefs. But that doesn't seem to be the case given that so many people believe in conspiracy theories and most people aren't mentally ill. Psychologists have identified a number of mental states, cognitive factors, and personality traits that predict belief in conspiracy theories (Wood and Douglas 2018), and many are converging on the idea that conspiracy thinking (sometimes called conspiracist ideation) drives beliefs in conspiracy theories (Brotherton et al. 2013).

Conspiracy theories were not by any means a fringe phenomenon. They seemed to exist during all eras I studied and were believed by majorities of people.

Conspiracy thinking is an underlying generalized worldview that to a greater or lesser degree drives individuals to see conspiracies lurking in the shadows (Uscinski et al. 2016); it



can be thought of as a bias against powerful actors that one doesn't like (Imhoff and Bruder 2013). People with higher levels of conspiracy thinking tend to believe in more conspiracy theories than those with lower levels of it (Uscinski and Parent 2014). Conspiracy thinking predicts not only beliefs in individual conspiracy theories but also agreement with scientific consensus and facts (Marietta and Barker 2018). Individuals displaying high levels of conspiracy thinking have been shown more likely to possess a toxic mix of psychological characteristics (Douglas et al. 2019): a willingness to conspire to achieve ends (Douglas and Sutton 2011), an aversion to gun control measures (Enders and Smallpage 2016), and an elevated acceptance of violence against the government (Uscinski and Parent 2014, 98). The concept of conspiracy thinking gets us pretty far, but such individual factors on their own don't tell the whole story.

Different polls ask about different conspiracy theories, but as polls ask about more conspiracy theories, the number of people who believe in none tends to decrease.

A fuller explanation of why people believe conspiracy theories must include the role of social and political factors, including the environments in which media and elites transmit information. It surprised me that conspiracy thinking in my polls showed that people on the political right and left showed equal levels of conspiracy thinking but people who identified as independents and as belonging to a third party showed higher levels (Uscinski and Parent 2014). Despite many journalists' claims to the contrary, quite a few studies show Republicans are not more taken in by conspiracy theories than are Democrats (e.g., Oliver and Wood 2014). This finding always seems to ruffle the feathers of people on the left (e.g., Krugman 2014), but even when it comes to the more zany conspiracy theories, partisanship is not a strong predictor of belief (Tingley and Wagner 2017; Uscinski and Klofstad 2018a). Partisanship matters, however, in determining which conspiracy theories one will accept or reject: Democrats who believe in conspiracy theories tend to believe that Republicans are conspiring against them, and Republicans who believe in conspiracy theories tend to believe that Democrats are conspiring against them (Smallpage et al. 2017). This is the case with other dispositions as well: Christians and Muslims are more likely than Jews to believe in Jewish conspiracy theories or to deny the Holocaust (Bilewicz et al. 2013; Nefes 2013); people with New Age beliefs are more likely than Catholics to believe in Da Vinci Code conspiracy theories (Newheiser et al. 2011); football fans living outside of New England are more likely than football fans from New England to believe that New England Patriots quarterback Tom Brady conspired to deflate his footballs to cheat (Carey et al. 2016).

Elites can have a lot of influence on conspiracy beliefs as well. One reason Republicans continue to believe that climate change is a hoax is that Republican leaders continually traffic in such theories (Uscinski et al. 2017). For example, Senator James Inhofe walked onto the Senate floor holding a snow-

ball and presented it as evidence that global warming was a conspiracy (Bump 2015). When leaders push conspiracy narratives, followers with high levels of conspiracy thinking will be persuadable (Atkinson and DeWitt 2018).

An additional factor is status. Conspiracy theories tend to come most from losers rather than from winners. Prior to elections (other factors being equal), members of both parties equally suspect fraud from the other side. But after elections, losers tend to claim they were cheated; winners tend to be happy with the results (Edelson et al. 2017). Going back to the letters to the editor data I discussed earlier, we found that when a Republican was president, conspiracy theories tended to accuse Republicans and their coalition of conspiring, but when a Democrat was president, conspiracy theories tended to accuse Democrats and their coalition of conspiring (Uscinski and Parent 2014). In this sense, conspiracy theories can be a tool used by losers to recoup from losses and generate collective action against a more powerful foe.

Conspiracy theories seem to have become more prominent in the aftermath of the 2016 election. Democrats have been on high alert because they are out of power: they have engaged in numerous conspiracy theories and have been quite susceptible to fake news (Coppins 2017; Beauchamp 2017; Dickey 2017). This is expected; what was less expected was the Republicans' use of conspiracy theories, given their winning status. Part of the explanation for this is that Donald Trump was not an ordinary candidate. When he entered the Republican primary he could not compete against his twenty-five opponents on the normal playing field; he could not out-Republican them (because he was not much of a Republican) nor could he claim to have more experience (since he had none). Instead, he needed to change the rules of the game, and he used conspiracy theories to do just that. In Trump's rhetoric, the entire establishment was corrupt, therefore it followed that those who had spent time in it were also corrupt. This turned experience on its head and made Jeb Bush's and later Hillary Clinton's extensive experience in government a liability. Trump's conspiracy rhetoric attracted the conspiracy wing of the Republican Party into his camp, and polls show that Trump's supporters were more likely to believe conspiracy theories than supporters of other candidates (Cassino 2016). The end result is that the United States now has a president who engages in constant conspiracy theorizing because he built a coalition of conspiracy-minded supporters. He now has to dance with the ones who brought him to the prom. It does not appear (as of yet) that belief in conspiracy theories has increased writ large in the past few years; instead, conspiracy theories have just become more prominent in our elite rhetoric and media reporting (Uscinski 2018).

I would like to offer simple solutions to fighting back against conspiracy theories, but I do not think there are any. It is difficult to correct individuals' conspiracy beliefs (Nyhan and Reifler 2010), and until political elites disavow them, conspiracy theories will continue to benefit from having a big megaphone. Just studying the topic is itself challenging because devoted conspiracy theorists resist being studied and resent the notion that their beliefs might be based upon anything other than an honest weighing of the evidence. In particular, I am often told by conspiracy theorists that I am a government agent or Satanic elite (for the record, I am neither). I am also told that the term *conspiracy theory* was invented by the CIA to shut down debate over the Kennedy assassination. But they didn't invent it (McKenzie-McHarg 2018), and if they had, the scheme didn't work anyway because Kennedy Assassination theories seem to be the most popular conspiracy theories in the United States (Swift 2013).

We all fall victim to conspiracy theories from time to time. They can be entertaining and enthralling because they follow a successful trope: evil unscrupulous villains taking advantage of innocent hapless victims. This might sound like a tautology, but when we believe a conspiracy theory, it's because we believe it's true—and not because we think it's dubious. In this sense, no one believes that they believe in conspiracy theories (instead they believe that they believe in conspiracy facts). We need first and foremost to know our own biases, subject our own beliefs to scrutiny, and be aware that some of our most sacred beliefs may be nothing more than conspiracy theories.■

An additional factor is status. Conspiracy theories tend to come most from losers rather than from winners.

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A Stegosaur Carving on the Ruins of Ta Prohm? Think Again

An ancient Khmer carving has been interpreted as a stegosaur, leading some to conclude that dinosaurs and humans lived together. An investigation of the claim and other carvings suggest otherwise.

SCOTT E. BURNETT

Did dinosaurs live alongside humans within the past 10,000 years? Human footprints alongside dinosaur tracks at Paluxy near Glen Rose (Texas) and dinosaur figurines in archaeological contexts at Acambaro (Mexico) are among the evidence suggested to indicate so. Once properly studied, investigations revealed the Paluxy claims to be misinterpreted eroding features and dinosaur tracks, alongside outright hoaxes (Cole and Godfrey 1985; Kuban 1986). The Acambaro figurines were found to be modern manufactures subsequently planted in legitimate archaeological contexts (Di Peso 1953). Regrettably, the misinterpretation of paleontological and archaeological evidence continues (e.g., Butt 2008; Butt and Lyons 2008), requiring new analyses of the evidence and the claims themselves. Fortunately, there has been renewed skeptical attention in recent years, including effective examinations of ancient art purportedly depicting dinosaurs (e.g., Senter and Cole 2011; Senter 2012; Senter 2013; Le Quellec et al. 2015).

However, an ancient temple carving in Cambodia interpreted by some to represent a stegosaur has received little interest from the skeptical or scientific communities other than limited treatment online (e.g., Switec 2009; Nelstead 2009; Carter 2014; Kuban 2014). Here I will provide some critical thinking and anthropological insights regarding the "stegosaur" of Ta Prohm, including new evidence gained by an inspection of the location and surrounding sites in the Angkor Archaeological Park.

Ta Prohm is one of many ruins associated with the Khmer civilization of Southeast Asia, which spanned the ninth to fifteenth centuries AD. Originally known as Rajavihara, Ta Prohm is the modern name for a Buddhist monastery constructed by Jayavarman VII who reigned for several decades beginning in 1181 AD (Kapur and Sahai 2007). His reign is

Figure 1. The Ta Prohm carving some contend to represent a stegosaur based largely on the interpretation of dermal plates along the back.

Figure 2. The Ta Prohm "stegosaur" is part of a vertical strip of roundel carvings. Numerous figures above and below contain dorsal or other peripheral ornamentation, including human figures near the top of the column.

noted for the increased prominence of Mahayana Buddhism, though both Hinduism and Buddhism are represented among sites in the region (Kapur and Sahai 2007). Many readers may have actually seen Ta Prohm, at least in part. The 2001 film *Lara Croft: Tomb Raider* used the picturesque ruins and nearby sites as part of the backdrop for the film, pitting the fictional archaeologist (played by Angelina Jolie) against the Illuminati. What viewers did not see is the reason for more recent attention on Ta Prohm: a bas-relief carving that some interpret as representing a dinosaur that is found among the tree-covered walls and tumbled sandstone blocks.

After references to a stegosaur-like image began to appear in guidebooks to the ruins of the ancient Khmer (Jacques and Freeman 1997; Freeman and Jacques 1999), young-earth creationists used the supposed stegosaur depiction as evidence that dinosaurs and modern humans lived side-by-side on a young Earth. In an online posting over a decade ago, creationist Don Patton (2006) described the carved image (Figure 1) from the Khmer temple Ta Prohm, and the claim subsequently gained traction in creationist literature (Butt and Lyons 2008; Isaacs 2010; Gilmer 2013; Clarey 2015; Woetzel 2017). The superficial resemblance to a dinosaur satisfies the predetermined conclusion already drawn by young-earth creationists, who are motivated to bolster a worldview predicated on the compression of billions of years of Earth history, and the extinct and extant life on it, into less than 10,000 years. As such, the claim runs the risk of confirmation bias in which evidence is sought and interpreted, often inadvertently, in ways that are preferential or biased according to preexisting beliefs, expectations, or hypotheses (Nickerson 1998).

It is important to critically address interpretations of the Ta Prohm carving, as it is claimed to be some of the best evidence for recent contemporaneity of dinosaurs and humans (Isaacs 2010; Clarey 2015). The stegosaur claim made by young-earth creationists consists of four principal components:

1. The carving resembles a stegosaur, an ornithischian dinosaur;
2. The image is an ancient carving and not a modern-day hoax;
3. There are many other familiar animals represented, so the Ta Prohm carving represents a real animal; and
4. Stegosaurs must have been known to the inhabitants of Ta Prohm or at least to the sculptor who apparently depicted it.

Let's examine these components, in brief, before analyzing the alternatives in more detail. While the carving does resemble a stegosaur, the similarity is superficial. It rests largely on a single criterion—the appearance of what are perceived to be dermal plates along the back. Others have pointed out that the Ta Prohm carving lacks additional anatomical features of stegosaurs, including a long neck, a small, unornamented head, and tail spikes. The latter are often referred to by paleontologists as the *thagomizer* after an early *Far Side* cartoon—who says scientists are humorless? While these anatomical inconsistencies are often overlooked or dismissed via special pleading by proponents of the stegosaur interpretation, a new suggestion has appeared in the literature recently: the large head and horn-like projections are actually evidence of a muzzle over a smaller head, while the typical tail spikes were removed by their keepers to make them less dangerous (Woetzel 2017). In other words, some contend that the ancient Khmer not only lived alongside dinosaurs but had also domesticated them! Such wild speculation cannot account for other anatomical incongruences. For example, less frequently mentioned is that the limb proportions of the animal in the carving do not seem to display the profound discrepancy in limb length seen in stegosaurs, with their elongated hind limbs and relatively short, squat forelimbs. So while the carving resembles a stegosaur at first glance, the similarities are limited to the apparent dorsal plates. Other possibilities exist to explain the presence of this single characteristic. For example, they could represent background foliage or merely decorative elements, and a recent attempt to dismiss this possibility and discern the intent of the carver through limited measurements (Woetzel 2017) is unconvincing.

As for the second contention, there is no reason to think that the Ta Prohm carving is a modern hoax. References to the carving predate the filming of *Lara Croft: Tomb Raider*, so

it is unlikely to have been doctored by a visiting movie crew, for example. Furthermore, Ta Prohm has seen little of the reconstruction work seen at other nearby sites. Although the image is lighter than most surrounding images, the remnants of patina, the depth of the carvings, and the amount of overburden all support the image being original to the complex. My visits to Ta Prohm lead me to believe that the Ta Prohm carving is not modern and is only lighter than surrounding carvings because someone has zealously cleaned it for photographing.

Patton and others are also correct that many animals can be recognizable in other pilaster roundels and bas-reliefs at Ta Prohm. Nevertheless, we should be cautious with our ability to interpret art across cultures, let alone those separated by over eight centuries, and particularly out of context. After all, interpretations of a "water buffalo" noted by Patton just above the "stegosaur" (Figure 2) vary widely. It is even referred to by one Angkor guide as a kangaroo, an interpretation that is likely influenced by a more upright body posture than expected for a large quadrupedal bovid. Specifically, I believe that most proponents of the carving as a stegosaur, many of whom do not appear to have visited the site, insufficiently acknowledge that mythological animals are also frequently represented in Ta Prohm roundels or in other bas-reliefs in the Angkor region. Some even bear divinities as riders (Figure 3). Furthermore, the distinction between natural and supernatural fauna is not clear-cut in Khmer temple symbolism.

Sites in the Angkor Archaeological Park are imbued with religious symbolism from both Hindu and Buddhist traditions. A Khmer carver may have created one of many animals figuring in Hindu or Buddhist mythology that, in this case, shares a superficial similarity with a stegosaur, albeit coincidentally. In fact, several of the animals recognized by Patton, including the monkey and deer, may be mythological in origin and may not have been intended to portray local animals as he assumes. The Indian hero epic *Ramayana* is a frequent subject matter in stone carvings at ancient Khmer sites. Several monkey characters appear, including anthropomorphic monkey brothers who are estranged over a kingdom of monkeys. The hero of the epic, Rama, encounters them while pursuing the demon who kidnapped his wife, Sita, after luring her away with another demon who assumes the appearance of a beautiful golden deer.

In light of the potential that the stegosaur interpretation of the carving has been all too readily accepted because it is perceived as supporting a pre-drawn conclusion of a young Earth, I have considered several alternatives. To do so, I spent ten days visiting the Angkor Archaeological Park during the summers of 2011 and 2017. Aside from exploring Ta Prohm on three occasions, I visited dozens of monuments in the region constructed over a span of more than 400 years (ninth to thirteenth centuries AD, primarily). Though the sites vary in their construction and use of bas-reliefs and sculpture, holistically the sites visited provide a broad sample of monuments to evaluate, both predating and contemporaneous with Ta Prohm. My search, encompassing roughly between seventy and eighty hours over the two trips, was intensive. Many carvings are eroded, covered in vegetation, and buried, while others are vandalized or stolen; many site complexes still lay in piles of rubble.

I pursued two primary inquiries.

1. Many assume that the animals depicted are real animals that are familiar to the artist, even going so far as to claim, "There are no mythological figures among the roundels, so one can reasonably conclude that these figures depict the animals that were commonly seen by the ancient Khmer people in the twelfth century" (Cole 2007). However, the possibility of this animal being mythological should not be quickly dismissed. During my visits, I looked for creatures that were mythological in nature. The presence of mytho-

Figure 3. Supernatural and mythological creatures are common at Ta Prohm. Seen here are a divinity on his mythological mount (left), *garuda* (center), and a muscular rabbit-like, bird-beaked chimera with dorsal plates (right).

Figure 4. Floral and vegetative motifs on their own (left), behind one (center left), or more figures (center right). Animals are sometimes depicted on flowers (right top), or in front of flowers (right middle) or other vegetation (right bottom). All photos from Ta Prohm except image from Bayon at right bottom.

logical animals at Ta Prohm would draw into question the contention that the stegosaur carving *must* be a real animal.

2. Could this carving actually represent the melding of an animal in the foreground with a background motif? As mentioned earlier, the plates on the back of the animal depicted in the Ta Prohm carving may represent background elaboration or even foliage. For supporting evidence, I looked for other animal carvings with similar "plates," foliage, or other background motifs. In addition, if the dermal plates on the supposed stegosaur are really just background or decorative elements, then there might be depictions of the same animal without the background elaboration. Accordingly, I searched for other depictions of a morphologically similar animal, focusing on the presence of five key characteristics—quadrupedal posture, thick limbs of roughly equal length, an arched back, ornamented head, and long tail, in the absence of a sixth characteristic—dorsal plates.

My findings? Anyone who has spent any significant time at the Angkor Archaeological Park examining bas-relief or sculpture cannot reasonably come to the conclusion that the depictions must all be of real animals. Why should we expect them to be? The ruins are full of Hindu and Buddhist iconography and symbolism, often both at the same complex. *Garuda*, *nāga*, *hamsa*, *kāla*—mythological and supernatural beings abound at sites in the region. Some are chimeric in nature, including at Ta Prohm a muscular animal sitting upright, with a bird beak and long ears or horns (Figure 3). It also bears plates along the back reminiscent of the "stegosaur." It is simply erroneous to assert that the stegosaur-like animal *has to be* a genuinely known species and not mythological. Why should we be surprised? The carvings at Ta Prohm, like other Angkor sites, primarily reflect the dominant religious symbols and iconography at the time (Roveda 2005). Ta Prohm, as a monastic temple, is no exception. Images at the monument simply cannot all be interpreted as literal, informational placards representing local fauna.

I also found clear evidence suggesting that ornamental elaboration and vegetation are much more parsimonious explanations for the appearance of the animal (Figure 4). Dorsal ornamentation or vegetation is clearly associated with the animal immediately above the stegosaur (Figure 2). Even higher in the column of images that appear to be conveying a narrative of sorts, are plate- or petal-like depictions surrounding a vandalized Buddhist image (many images of Buddha or Bodhisattva were defaced during the religious iconoclastic upheaval after the rule of Jayarvarman VII) and other hu-

Figure 5. Both Ta Prohm carvings appear to depict the same quadrupedal animal with a large, ornamented head, arched back, thick limbs of equal length, and long tail. This suggests that the "dorsal plates" responsible for the superficial resemblance to a stegosaur (left) merely represent vegetation or other artistic elaboration.

mans containing background plate-like elements, sometimes extensively. On other occasions, vegetation might be seen underneath or behind animals, often regardless of differences in scale.

Some skeptics have claimed that the image represents another real animal with or without background vegetation (the dorsal plates), with rhinoceros, boar, pangolin, and lizard among the potential candidates (Roveda 2005; Novella 2008; Carter 2014; Kuban 2014). I am leery of most of these identifications, primarily because each differs morphologically as much from the carving as does an actual stegosaur. I did, however, find an image of a similar animal without the dorsal plates—compelling evidence that these features thought to be dorsal plates are likely to be background or design elements, regardless of whether the animal was intended to represent a real or mythological species. Near the end of my last trip, I noted some carvings near ground level in the same general area as the purported stegosaur. There, roughly eighty feet south I found an animal fitting all of the primary characteristics of the carving in question—quadrupedal, thick limbs of equal length, arched back, ornamented head, and long tail (Figure 5). The only key distinction is the lack of plates along the back.

Confirmation bias can lead some to interpret possible evidence more favorably than merited and, as seen above, ignore or downplay alternative possibilities. In this case, to critically examine the claim that the Ta Prohm carving represents an actual stegosaur, it is also necessary to consider the many unanswered questions this improbable position entails, independent of the image itself. For example, why is a single stegosaur represented and not other dinosaurs if they truly coexisted with humans? Why do we not find their bones in recent natural or cultural deposits from Cambodia? Why are they not represented on ceramics or other forms of Khmer art, or even depicted in the numerous other sites pre-dating, contemporaneous with, or post-dating Ta Prohm? Indeed, why are dinosaurs not among the extensive species lists culled from the seventh to fourteenth century Khmer or Sanskrit inscriptions at Angkor sites (Jacob 1993), nor those compiled by Zhou Daguan (2007), the Chinese ambassador to Angkor who chronicled his year there, at most a mere century later, including a description of the local fauna? These lists contain domestic and wild fauna, including fish, birds, reptiles, amphibians, and mammals, from the lowly tick and ant to the mighty elephant and rhino. Why then no stegosaur? Given the results of my inquiry into the carvings at Angkor and the identification of another carving without the dorsal plates but demonstrating all the other morphological hallmarks of the purported stegosaur carving, the answer becomes even clearer: there were no dinosaurs living alongside the Khmer. ■

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Teaching College Students Critical Thinking Skills by Posing as a 'Registered Psychic'

When college students who signed up for a class called Critical Thinking about the Paranormal were introduced to a guest speaker who claimed "psychic ability," they were taken in by his cold reading abilities.

BOB BAUGHER AND PHILIP HALDEMAN

Twenty-five years ago, I met Philip Haldeman, cochair of Seattle's Northwest Skeptics, and we formed a friendship. One of the many topics of interest we shared was cold reading. As a result, over the years I have invited Haldeman to my general psychology classes to pose as a psychic and see how my students would react. At first, Haldeman doubted that even a studious application of cold reading techniques could fool college psychology students. But time and time again he was successful, convincing my students of his amazing "psychic" abilities. After his "readings" of the students' lives for much of the class time, I would shatter the reality of what Haldeman was doing by announcing that he was in fact a fraud.

I have been teaching a class titled Critical Thinking about the Paranormal. Despite the first two words of the title, I've found that students are attracted to the class because of the last word in the title.

Since 2003, I have been teaching a two-credit class once a year at Highline College in Des Moines, Washington, titled Critical Thinking about the Paranormal. Despite the first two words of the title, I've found that students are attracted to the class because of the *last* word in the title. Like most people, my students are fascinated with claims of the paranormal but haven't developed critical thinking skills to evaluate the claims.

On the first day of class I introduce Haldeman as a "registered psychic." (This introduction by an authority figure is one of the most important elements of the deception.) Prior to his "reading," I pass out a paper that asks students to rate their belief in ESP by answering the following question:

My general belief in ESP is:
a. Extremely high
b. Very high
c. Somewhat high
d. Not sure
e. Somewhat low
f. Very low
g. Extremely low.

After Haldeman briefly elaborates on his credentials (mentioning, for example, that he is speaking on the first day of class because he must fly out of town to help a police department find a missing person), he begins his cold readings. For the next thirty minutes, Haldeman gives his psychic performance using a list of likely "hits" he has memorized beforehand. He engages students eye-to-eye with statements such as, "I see a family in conflict. Would you care to say something about it?" or "What is this problem you are having with your car?" or "Who is Michael?" or "I see you are trying to choose between two careers." In a typical session, Haldeman is able to "read" fifteen to twenty students.

The more Haldeman did these demonstrations, the more confident he became as a "psychic," for he began to realize that the cold reading techniques he was using were nearly goof-proof. One time, he came up to a young woman with his usual, "Are you having some sort of problem with your car?" (The hit rate on this is quite high among college students.) The woman looked puzzled: "I don't own a car," she said. Now, this should have been embarrassingly wrong, but Haldeman said, "Oh, I see. That certainly *is* a car problem—not having one!" Haldeman learned to widen the basket so that, for example, if a person's car was just fine, he'd simply *predict* a problem on the way, and that the person should be on alert. One time, a student had just wrecked his car a week before! An amazing hit—and of course the other students remember these hits when they occur and tend to forget when the psychic was wrong. This is the phenomenon of selective perception.

Following Haldeman's demonstration, I ask the students to again answer the same question (as above) and to estimate the percentage of correct "readings." Then I announce: "Phil is not a psychic. He is a friend who does what the scientific community calls 'cold reading.'" With most students' mouths agape, Haldeman and I proceed to discuss the many factors that contribute to the apparent reality of such readings. Following the discussion, I ask them to respond a *third* time to the same question.

I have compiled the results of this exercise. With the answers to the questions from 124 students, I performed two paired t-tests:

1. Between the "before" condition and "just after Phil's performance" condition.
2. Between the "before" condition and "just after Phil is not a psychic" condition.

In coding the responses, I assigned a 1 to answer a, a 2 to answer b, and so on to 7 for answer g. In addition, in the "just after Phil's performance" condition, I asked students to estimate Haldeman's "hit" rate in terms of percentage.

Here are the results:

1. The mean response of the 124 students to the "before" condition was 3.41 (SD=1.63), which put the average response about halfway between "Not sure" and "Somewhat high."

2. The mean response to the "just after Phil's performance" condition was 2.96 (SD=1.66), moving up to "Somewhat high."

3. The mean response to the "just after Phil is not a psychic" condition was 4.16 (SD=1.87), indicating that the average score had moved down to "Not sure." See graph below for comparison.

4. When a paired t-test was performed to detect any difference between the "before" and "just after Phil's performance," the result was a *significant* ($p<.0000003$) *increase* in ESP belief.

5. Twenty-one (17 percent) of the students answered "a. Extremely high" belief in ESP in both the "before" and "just after Phil's performance" condition. Because these scores could not increase, they were eliminated from the next analysis.

6. Of the remaining 103 students, 41 (40 percent) showed an increase toward believing more in ESP while eight (8 percent) actually showed a decrease after Haldeman's performance.

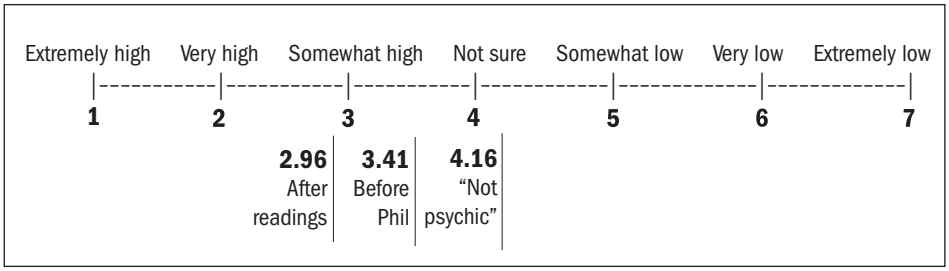
7. A paired t-test was then performed comparing the "before" score with the "just after Phil is not a psychic" score. The result was a *significant* ($p< .000000001$) *decrease* in ESP belief.

8. Five (4 percent) of the students had already answered "g. Extremely low" belief in the "before" condition and answered the same in the "just after Phil is not a psychic" condition. These five were eliminated from the next analysis.

9. Of the remaining 119 students, 55 (46 percent) showed a decrease in the direction of belief in ESP following the announcement that "Phil is not a psychic" while 11 percent showed an increase in ESP belief.

10. When asked to score Haldeman's accuracy rate, the average was 74 percent with scores ranging from 5 percent to 100 percent.

In interpreting the findings it is clear that many students enter the class slightly leaning toward a belief in ESP. In fact, 17 percent came into class already having an "extremely high" belief in ESP. The thirty-minute cold reading demonstrates that it is a powerful intervention that moved 40 percent of the students toward the "somewhat high" belief. Yet when students discovered how easily they could be fooled, 46 percent showed a decrease from their original belief, moving into the "not sure" range.



The average of the students' degree of belief in ESP at different points during the experiment.

One of the interesting findings is that 8 percent of the students actually showed a *decrease* in their belief just following Haldeman's performance (but *not* before we revealed him to be a fraud). It may have been that they were the small group of students who were not taken in by the demonstration. Another finding was 11 percent showed an *increase* in ESP belief *even after we revealed the cold reading trick*! It may be that some of these folks stubbornly believed that, even though Haldeman was a fake, there still must be true psychics out there somewhere—or that Haldeman really was psychic, he just didn't realize it.

The 74 percent hit rate is clearly a demonstration of the power of cold reading. While some of students' written comments prior to the "reveal" suggested that some of the readings appeared "general," many were like the following:

1. When he first started reading people, I thought that he was using techniques to read people. However, when he started throwing out names and I saw other people's reactions and them being surprised, it became a lot more believable to me.
2. I thought, there is no way this guy could make all this up.
3. I never thought I would believe in this stuff, but that was freaky.
4. I wonder how he does it. I want to be able to do that
5. After he did some readings, I was 90 percent sure I believed him.

Haldeman does not much enjoy doing this; he worries in the days leading up to the event, as an actor might before going on stage. Also, he still imagines that few of his cold reading statements would seem credible and has visions of a student jumping up saying "You're a fraud!" (One person in a local television audience actually did this during the taping of a show with psychic James Van Praagh while I was on stage as the skeptic.) One time, Haldeman came up to a young woman with his usual "Who is Michael?," and the woman burst into tears. Haldeman did not pursue that particular reading, but the example shows the discomfort that can occur. (Do psychics who take people's money care what effects they have on the unsuspecting?) Nevertheless, Haldeman continued to help me teach critical thinking.

One time, Haldeman came up to a young woman with his usual "Who is Michael?," and the woman burst into tears.

During the classroom debriefing, one of the issues we always discuss is the obvious ethical concern: I lied to my students. Indeed, every time I do this I am aware, of course, that my students are being deceived. As a psychologist, I have an ethical obligation in all my professional interactions. Section 8.07 "Deception in Research" of *The American Psychological Association Ethical Principles of Psychologists and Code of Conduct* reads:

> (a) Psychologists do not conduct a study involving deception unless they have determined that the use of deceptive techniques is justified by the study's significant prospective scientific, educational or applied value and that effective nondeceptive alternative procedures are not feasible.

Further, section 8.8 on "Debriefing" reads:

> (a) Psychologists provide a prompt opportunity for participants to obtain appropriate information about the nature, results, and conclusions of the research, and they take reasonable steps to correct any misconceptions that participants may have of which the psychologists are aware.

From a practical standpoint, neither Haldeman nor I take joy in the deception, although we admit to its cleverness as an educational tool. In other words, as noted in section 8.07, we do feel that the deception is warranted; the debriefing period is a time to discuss the inherent issues of this format.

In summary, after more than a quarter century of providing college students with an opportunity to detect the exact deceptive practices used by psychics, it is clear that skeptics, researchers, and educators still have much work to do. Moreover, if it is still this easy to deceive college psychology students (even those who sign up for a class with the words *critical thinking* in the title), consider the nearly effortless deception of many by those who shamelessly call themselves "psychics." ■

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Confessions of an American Opium-Prescriber

Thousands of Americans have died from opioid overdoses after receiving medical treatment for pain or addiction. However, new clinical dilemmas often confront prescribers who try to protect patients through reducing doses or substituting safer medicines.

PETER BARGLOW

The title of this article originates in the 1821 drug memoir of Thomas De Quincey, who at age nineteen (in 1804) became addicted to Laudanum, a preparation of opium dissolved in alcohol prescribed for rheumatic pain. In his *Confessions of an English Opium-Eater*, he wrote, "Oh, heavens! what a revulsion! what an upheaving, from its lowest depths, of inner spirit! what an apocalypse of the world within me!" (33). Although De Quincey began his opium habit to relieve pain, drug-induced euphoria transformed him into a recreational user. As he fell into addiction, he began to suffer cycles of intolerable intoxication and physical misery, particularly stomach agony.

This article evaluates the current opioid overdose crisis in the United States through the eyes of a physician. This epidemic has become so severe in recent years that it has led to a decrease in average life expectancy. It has produced more annual fatalities than those attributed to suicide or homicide, to recent wars, or to epidemics involving infectious agents. In 2019, the number of opioid-related fatalities will likely reach 50,000, the same as the number of AIDS-related deaths in the peak year of that epidemic in 1995. During the past fifteen years, more than 200,000 Americans have died of opioid overdoses. About one-fifth of this group once suffered from chronic pain (and most likely addiction complications) that doctors usually treat in office settings. Statistical evidence shows that since 2012 there has been a slow but steady decline in opioid prescription, explained partly by doctors resisting the pressure of patient demands for relief of pain (CDC 2017). Psychiatrists were hopeful that this trend and the recent success of skilled intervention applied to groups of vulnerable persons signaled an end to this crisis, but the national overdose death toll has *not* declined during this period, probably because of large increases in heroin and fentanyl use (Madras 2017).

I must confess that my own efforts have been bedeviled by unexpected thorny limitations and complications. We physicians were not fully aware of the new problems created by broad solutions and failed to sufficiently recognize the individual vulnerabilities of unique patients. This article explores the misunderstanding.

First, we should remember that opioids have successfully alleviated severe pain for thousands of years (Offit 2017); sometimes there are also mood benefits. I prescribed buprenorphine as a last resort to help a forty-year-old patient, a stockbroker who suffered from a severe suicidal depressive disorder. He had recently terminated twenty years of unsuccessful psychoanalysis. Conventional antidepressant medication management was of no help either. Usually happy in a long marriage, he lost sexual interest in his partner and felt constantly helpless and despondent. Ordinarily trifling self-esteem challenges were interpreted as catastrophes, and

This Drug May Impair The Ability To Operate A Vehicle, Vessel, Or Machinery. Use Care Until You Become Familiar With Its Effects.
May Cause Dizziness
Some Nonprescription Drugs May Aggravate Your Condition. If You Have Questions, Check With Your Doctor Or Pharmacist.
Take Or Use This Medicine Exactly As Directed. Do Not Skip Doses Or Discontinue Unless Directed By Your Doctor.
WHITE ROUND TABLET
Caution: Opioid. Risk of overdose and addiction.
AN 627
WHITE ROUND TABLET
(MS627)

he made major mistakes in his business dealings. The extraordinary severity of symptoms merited a different treatment approach—opiates. To the surprise of both of us, he has experienced relief of major depressive symptoms for the past ten years while continuing to take moderate amounts of buprenorphine and has not developed tolerance to the medicine. At least in some circumstances, opioids do have benefits beyond relief of physical suffering.

For readers who are not medical specialists, I will review salient details of the current science of opioids. These biochemical neuropeptide substances can nullify pain and alter moods, including depression. They are almost always addicting and lead to higher doses over time because of consequent states of euphoria, transitory well-being, and even grandiosity. As documented above, deaths are caused by overdoses. Opioid effects mimic beta endorphins, substances naturally occurring in the human body. These exert their biochemical, medical, and mind-altering influence at so-called "Mu receptor sites" in the body that are selectively responsive to their stimulation. When exposed to medicinal or recreational long-term use of high-dose opioids that generate addiction, neural structures sensitive to beta endorphins can suffer damage that is difficult to undo or reverse.

I must confess that my own efforts at curbing the opioid crisis have been bedeviled by unexpected thorny limitations and complications.

Most of the chemicals involved with the current opioid crisis are natural opiates found in the resin of the opium poppy, *papaver somniferum.* They include about two dozen alkaloids, of which morphine and codeine are the most familiar pain remedies. A number of other common opioids might be familiar to readers. The semi-synthetic opioids hydrocodone, hydromorphone, oxycodone, oxymorphone, and codeine are also chemically modified derivatives of the poppy plant. Fully synthetic drugs such as Darvon (propoxyphene) and Demerol (meperidine) are slightly more potent pain remedies. Oxycontin is a slow-release form of oxycodone and is a modification of the opiate alkaloid thebaine (paramorphine) found in opium. This medicine has been proven highly addictive and is often fatal in uncontrolled doses. Its manufacturer, Purdue Corporation, has paid almost a billion dollars in legal penalties because of misleading marketing. Tramadol is a synthetic non-opioid agent that is a weak analgesic rarely causing dependence.

The seedpod of the opium poppy plant, modified by a half-dozen common chemicals, is also the source of heroin. This notorious, illegal-today drug was first produced in 1898 in Germany and offered as a safe "wonder" medicine for cough and pain. The inventor, Heinrich Dreser, developed an easily reproducible process of acetylation of morphine that enormously elevates its potency—heroin is about fifty times as powerful as morphine. Heroin dependence often starts with routine office remedies for pain, and it is estimated that as many as 80 percent of heroin users started their addiction with prescription opioids (Compton et al. 2016). Even more dangerous than heroin are synthetic substances such as fentanyl and carfentanil, a drug used to tranquillize elephants. Fentanyl is fifty to 100 times more potent than morphine; more often than heroin, it kills many addicted persons who lived for years while routinely using less-potent opioid drugs (Mather 1983). It was responsible for over a third of the 72,000 U.S. overdose deaths in 2017 (NIH 2019). It is critical to remember that opioid-misuse death only rarely takes place secondary to a single drug. Cocaine, amphetamines, alcohol, or benzodiazepines almost always complicate the clinical opioid danger (Seth et al. 2018). This danger severely limits the outcome of even the best outpatient addiction and pain treatment efforts directed primarily toward opioids.

Roughly 60 percent of older Americans on Medicaid have been reported to have chronic non-cancer-related pain (Olfson et al. 2017). This aged population is heavily afflicted by opioid dependence, and its members frequently have an accompanying diagnosis of an opioid-use disorder. Research on other large populations such as U.S. Department of Veterans Affairs (VA) patients (Bohnert et al. 2011), jail and prison inmates (Troilo 2018), and large groups of Florida's inhabitants who were prescribed opioids in outpatient and inpatient settings identified in official morbidity-mortality reports (Florida Department of Law Enforcement 2017) all point to significant opioid dependence in older Americans. On the basis of the best available research I could identify, this past year I compared three major possible intervention strategies for such populations (Barglow 2018). I included data and commentaries from outcome reports of large treatment efforts to lower fatality rates for drug-addicted patients in several European countries, the Philippines, and China. Each intervention type has been found to have clear advantages, risks, and dangers. All three have major expert advocates as well as equally persuasive scholar opponents.

A *demand reduction* strategy responds to the difficulty of curtailing access to opioids by modifying the human motivations that result in overuse. The urgent demand for relief of suffering is counteracted by "behavioral immunity" induced through forcefully enhancing risk aversion. The stigma of addiction, illustrated for example by derogative terms to describe addicts, triggers shame and keeps many patients from seeking treatment. But it has not become a major deterrent to drug overuse. *Junkie zombie* was the term for stumbling addicts in the early twentieth century who supported their habit by collecting and selling scrap metal. Less colorful terms such as *dope fiend*, *stoner*, *pothead*, *street addict*, and *dirt* are still widely used today, even by some members of the addiction-treatment community. Urine tests showing the presence of illegal drugs are still customarily labeled "dirty" while a "clean" sample is negative for drugs. These pejorative images fuel widespread public opposition to efforts to ameliorate opioid overdose risks. For example, legalization of needle-exchange sites to provide clean needles is vociferously opposed, despite evidence showing that such publically des-

ignated areas are proven to reduce overdose risk and disease transmission.

Pain-relief treatment using opioids varies across geographic locations in the United States. Nearly 10 percent of adults in rural settings receive opioid prescriptions—about twice as many as in large metropolitan counties (Garcia et al. 2019). On an international scale, countries differ massively in the amounts of opioids consumed. American opioid use is many times higher than that in other developed countries; Americans consume almost all the world's production of hydrocodone and similar agents. Variations in cultural attitudes and history across these different locations play a crucial role in generating tolerance to emotional or physical pain, with differences often expressed by capacity to tolerate suffering or exhibit a kind of stoicism. Thus physicians in Japan prescribe opioids for pain relief much less often, and in smaller doses, than American physicians do. Few contemporary experts believe that use of addictive drugs involves very much choice (Angell 2019). Libertarian scholars and journals with their traditional belief in free will have been the most fervent advocates of the demand reduction approach. But the persistent lethal toll of opioids over many years, along with scientific findings, has converted many of their healthcare scholars to acceptance of supply-limitation and legal remedies (Hart 2017).

A *supply reduction* strategy attempts to decrease the availability of addictive drugs. This approach targets the supply of high-potency medications such as fentanyl and illegal agents such as heroin. Considerable evidence prior to 2012 indicated that high prescription dosage levels were directly related to opioid overuse death. However, even tight regulation efforts do not always succeed, as shown by Florida's efforts to restrict prescription of these substances (Florida Department of Law Enforcement 2017).

The problem with this approach is that draconian restriction of opioid access driven by moral condemnation can have its own harmful effects. In a study of a large VA health system, I found that between 1993 and 1998, twenty-two of fifty-three officially reported suicides were opioid overdose deaths. Most in this group of patients perished after ill-advised efforts to rapidly detoxify from opioid prescribed agents (such as methadone) for pain or addiction (Barglow 2004). It is certainly true that some persons simply cannot survive prolonged opioid use, and in these instances the supply must be zero. One of my patients was eighteen years old and diagnosed with a bipolar disorder. For him even tiny amounts of opioid inevitably triggered a dangerous mood swing; here, zero tolerance was mandated. In general, however, abrupt and complete restrictions on opioid use can be very dangerous.

Given the frequent inadequacy of traditional supply limitation methods, imprisonment is the most common solution mandated by both American law enforcement agencies and many influential political leaders. Forced separation of a drug-dependent prison group from their habitual drug agents has high success during incarceration but a dismal record of abstinence after discharge (Binswanger et al. 2013). Concerns about racial injustice profiling of black Americans have motivated some scholars to avoid harsh curtailment of drug availability. Black criminals historically and currently are more likely to be incarcerated for longer periods of time than white criminals. Early in the opioid overdose epidemic, public attention and funding for treatment was assigned primarily to Caucasian populations. However, in 2017 black victims made up 12 percent of overdose deaths (twice the number of 2015), many involving fentanyl. Opioid overdose deaths in this ethnic group might have been overlooked within the U.S. penal system (James and Jordan 2018). Black scholars and researchers tend to be especially loath to advocate for harsh forced supply reduction interventions requiring imprisonment for long periods. Incarceration treatment proposals find much opposition in Native American communities as well (Shihipar 2019).

A *harm reduction* perspective maintains that abstinence might not be realistic for many users. Too rapid or sharp a dose reduction can actually increase the social, psychological, and medical damage of addictive substances. This approach informs policies, programs, and practices that attempt to reduce the negative consequences of sustained drug use. Originating in Australia, the United Kingdom, and the Netherlands in the early 1990s, this kind of intervention was initially designed to impede the spread of AIDS among injection drug users. Harm reduction focuses on reducing the consequences of opioid misuse through effective treatment, promotion of safe-use practices such as needle exchanges, substitution of lower-risk medications such as methadone or buprenorphine, and provision of opioid antagonists such as naltrexone or naloxone.

It is estimated that as many as 80 percent of heroin users started their addiction with prescription opioids.

A major challenge to this strategy is that the natural human opioid system is also a common pathway for antidepressant effects, including natural and placebo responses. Many pain sufferers are also quite depressed. The use of a potent drug to reverse or avoid opioid overdose, such as naltrexone, therefore may nullify antidepressant medicine capacities such as those of the promising new drug ketamine (Heifets et al. 2018). In addition, these methods are all quite expensive. Dr. Marcia Angell, a former editor of the *New England Journal of Medicine*, has been particularly active in efforts to allocate the funding to enable optimal use of this approach. In her recent review article about opioids, she writes, "Economic misery resulting from 'grotesque inequality' in America is responsible for 'deaths of despair'" (Angell 2019, 18).

From 2000 to 2010, one-fifth of U.S. patients with non-cancer-related pain were prescribed opioids in an outpatient office setting. The major recent difference in my own practice is my effort to reduce the danger of opioids for pain through prescribing methadone or buprenorphine. These medications are synthetically produced therapeutic

substitute opioids, which are now very widely prescribed in the United States. Substituting them for more potent opioids assists weaning patients off of heroin and other opioid agents. Buprenorphine is safer than methadone because it produces minimal euphoria, interferes little with cognitive functioning, and minimally jeopardizes respiration. Neither agent produces overdoses if used without co-drugs and under supervision of medical specialists. But to cease their use or to diminish dosage is difficult for most persons.

A patient of mine—a teacher, wife, and mother of three thriving children—had steadily reduced her buprenorphine dose. The medication had replaced addiction to large amounts of hydrocodone initiated after minor heart surgery. Beginning at 20 mg/day, after six months she was taking only 8 mg/day. However, she had saved the unused tablets (which I failed to collect). Unexpectedly, one day during a psychotherapy session she announced, "Doctor, I had to go back up to 20 mg of my medicine." "Why?" I inquired. It turned out that her uncle planned to divorce, and this news was "terribly distressing." So a trivial incident had triggered relapse to a much higher dose. Alas, patients rarely are able to cease use of such substitute therapeutic agents. For me, this reduction failure is a warning that Epidiolex, an FDA-approved marijuana substitute medicine (June 2018 for treatment of convulsions in children), will likely not ameliorate the opioid overdose crisis.

American opioid use is many times higher than that in other developed countries; Americans consume almost all the world's production of hydrocodone and similar agents.

Mistakes in using any of the above three interventions may provoke suicidal depression, all-pervasive obsession with drugs, or distressing withdrawal symptoms. The research of Krebs et al. (2018) even claimed—mistakenly—that there was little benefit from opioids for chronic orthopedic pain. Like most doctors, I have been under heavy social and political pressure to not overprescribe opioids. But I am more convinced by the arguments against severe curtailment of pain medication voiced by so many patients and their advocates (Leonhardt 2019).

In conclusion, we must remain skeptical of most contemporary generalizations about ending opioid overdose risks. Awareness by the public of their limitations and constant reminders to physicians that they must flexibly individualize pain and addiction treatment are vital. Experts are no longer as baffled by opium's influence as De Quincey was two centuries ago. Still there is much more we can learn from further clinical research studies. ■

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Creationist Funhouse, Episode Two

The Curse

In the first in this series, we found that creationists believe God red-shifted the light from the stars to make a young universe look like an old one. In this episode, we will discover that creationists believe God corrupted his own perfect and beautiful world.

STANLEY RICE

Creationists believe that when God created the universe, he made it perfect and good. In fact, each day of creation in the first chapter of Genesis has a refrain: "And behold, it was very good." (Genesis 1 is a song, not a scientific account. It has refrains, just like a song.) The goodness of creation is something that nearly everyone can instinctively feel when they go hiking in the natural world.

You are out in a forest of green leaves. Your soul is bathing in the beauty of nature. To the Japanese, this is quite literally what you are doing: *shinrin-yoku* means bathing in nature. A gentle susurrus stirs the leaves. A little songbird flits into view with a little insect in its mouth then flies away. You may not see them, but you suspect there are predators hiding in the branches. At such a time, even an atheist might echo the words of Genesis 1: *Behold, it is very good.* And the more you behold it, the closer you look at it, and the more you study it, the better it looks. Even an agnostic might not restrain from saying, "Praise whatever god there may be for this beautiful world!"

And this is the image presented in Psalm 104. The psalmist says:

> God makes grass grow for the cattle, and plants for people to cultivate, bringing forth food from the earth. He makes wine that gladdens the hearts of humans … and bread that sustains their lives. Birds build their nests in the cedars and storks make their home in the junipers … . When God brings the night, all the beasts of the forest prowl. The lions roar for their prey, and seek their food from the hand of God. When the sun rises, they hide in their dens. Then people go to work and labor until the evening. In wisdom God made all these things.

This psalm describes how beautiful the natural world is *right now* and how human activity can fit into this natural world. But if you feel that the natural world is perfect and beautiful, as the author of Psalm 104 apparently did, you would be very, very wrong from the viewpoint of creationists. In fact, they believe the natural world is damned and cursed.

* * *

Creationists believe the world of mountains, trees, streams, birds, and mammals was indeed perfect when God made it in Genesis 1. And it was perfect when God put Adam and Eve in the Garden of Eden. In fact, the world was so perfect that it seems impossible to distinguish between the inside of the garden and the outside. If this is so, where were the boundaries of the Garden?

But then one day, one of these beautiful and perfect animals—a snake that had legs and could talk—told Eve to eat the fruit of the Tree of Knowledge. Most people think the fruit was an apple, but according to one creationist film I saw back in the 1970s, it was an avocado. Eve ate it and then gave some of it to Adam, and he ate it also. That was when the world went to hell in a handbasket. This event is popularly called The Fall or The Fall of Man. That turned out to be one expensive avocado.

Loraine Thompson

According to early Christian theologians, and to many conservative Christians today, The Fall was Eve's fault. This is what the Apostle Paul said in 2 Corinthians 11. In the first letter to Timothy, chapter 2, the writer (who may not have been Paul) said that Adam was not deceived: "It was the woman who was deceived and became a sinner." What, then, can save a woman from sin? "But women will be saved through childbearing," said the letter to Timothy. That's right, ladies, you'd better get busy popping out babies if you don't want to keep shouldering the blame for all the evil in the world.

Adam and Eve, after eating the fruit, made garments for themselves out of leaves and tried to hide from God. This seems really strange if indeed God is all-seeing. But maybe God was not in fact all-seeing. Genesis chapter 3 depicts God as a person walking around in the Garden looking for Adam and Eve. In fact, He was walking around "in the cool of the evening," the time of day in the Middle East that is most pleasant. When God found them, he asked them what was going on and actually seemed surprised at their answer, which is strange if God is, in fact, all-knowing. When God discovered that Adam and Eve had eaten the forbidden avocado, the following events occurred, according to Genesis:

- God said that the ground was cursed because of Adam and Eve.
- God ejected Adam and Eve from the Garden out into the world.
- Out in the world, Adam and Eve had to make their living as farmers, which was hard work.
- But when they tried to raise crops, thorns and thistles came forth from the ground.
- God made clothes for Adam and Eve out of animal skins and told them they could now eat meat.
- God turned the snake into a legless animal without a voice.

But to creationists, this list is extremely incomplete. Before The Fall, they believe, there were no bad mutations in DNA. (DNA is the molecule that encodes all of our genetic information.) There were no parasites or diseases. There were no predators. While you may think that there is nothing evil about a bird eating an insect or a hawk eating a mouse, these are evil from the creationist viewpoint. And it may seem very strange to you to think that there were no predators before The Fall, because thousands of species of animals seem to be exquisitely adapted to chasing and subduing prey and eating meat from their carcasses. What about all the predators with big, sharp teeth, such as wolves, bears, lions, and tigers … and, of course, T. rex? As incredible as it may seem, creationists claim that all of these animals ate plants before The Fall. Why would a T. rex need such teeth to eat leaves, fruits, and nuts? Ah, you are not supposed to ask questions like that. God gave T. rex big, sharp teeth for whatever reason might have pleased him, but to be clear: T. rex did not eat meat. If you have any doubt of this, just visit a creationist museum and see the displays of sharp-toothed dinosaurs with plants hanging out of their mouths. That settles it.

In addition to all this, the creationist group Answers in Genesis claims that no animals ever died before The Fall. The Bible does not say this. Maybe, as I said in the previous article, they should call themselves Answers Not in Genesis.

According to the first Chapter of Genesis, God repeatedly commanded all the animals to "be fruitful and multiply." That is, to reproduce, and not just reproduce a little but to *multiply*. This is, in fact, the way populations grow: not by addition but by multiplication. If animals reproduced but never died, very soon they would have filled the world with their populations and eaten every bit of plant food that such a planet, no matter how green, could have produced. This seems like a ridiculous arrangement; it would seem that God would have made animals either reproductive or immortal but not both.

A possible answer to this dilemma is that when creating the world, God *knew* that the Garden paradise was not going to last. He knew that the snake was going to walk right up to Eve and give her a line of talk. He knew that his zoo of infinitely reproducing vegetarian tigers and immortal caterpillars was only a temporary arrangement. The Bible, of course, says nothing of the sort.

* * *

For animal death to suddenly enter the world, the entire ecosystem of the world had to be altered. What did God have to do to make the world into the arena of competition and death that it now is? Here are a few examples:

- A predator needs more than sharp teeth and claws. It also needs a digestive system that is adapted to meat. If you have any doubt of this, just try raising your guinea pig on dog food or your dog on hay. Pre-Fall predators would have needed a vegetarian digestive system, complete with an entire suite of bacteria that help the vegetarian stomach and intestines break down the complex roughage that is so abundant in leaves. God would have had to change herbivore digestive systems into carnivore digestive systems when Eve ate the avocado.
- Predators do not merely eat prey. They have a whole system of instincts for hunting their prey, and the prey have the instinct to hide. God would have had to rewire the brains of all the predators and all the prey to make them hunt and hide.
- Many prey animals have camouflage, which would have been useless before there were any predators to eat them. Other prey animals have toxins in their skins and have bright coloration to warn predators to not eat them, and this would also have been useless in a world without predators. God had to invent a whole suite of coat colors for prey, even of the smallest frogs and insects. Creationists wax rapturous when they describe how a praying mantis, which grabs and eats other insects, looks just like leaves. They say this is an adaptation that only a creator could have given, but why would a praying mantis have needed to look like leaves if it did not have to hide from predators?
- Animals do not simply die. They undergo senescence. Senescence is a very complex genetically programmed shutdown of bodily systems. All animals are *built to die*. This is why your hair gets thinner as you get older. God

had to design all of these genetic programs.

Some creationists go even further. They claim that the Second Law of Thermodynamics began at the time of The Fall.

The Second Law is one of the basic laws of the universe. It indicates the universe is running down and becoming more disorderly. For example, big molecules break apart into smaller molecules. This is happening all the time right now in your body. The reason you do not fall apart is that you have enzymes that keep rebuilding you, molecule by molecule, every moment. Your enzymes create order. But to create order in one place, they have to create disorder someplace else. That's The Law. Eventually, your body loses the race against the Second Law, and you start to gracefully but inevitably degenerate.

To some creationists, a perfect world as created by God could not have included any form of degeneration, and therefore God created the Second Law at the time of The Fall. This meant that he had to reconfigure every physical and chemical process in the universe. The stars (including the sun) had already been shining for at least a few days, by means of some mysterious form of thermodynamics that we cannot imagine today. Plants carried out photosynthesis, and animals digested plants, through chemical reactions that had to be totally different from the ones they now have, because biochemistry is based on thermodynamics. God therefore had to recreate the whole universe at the moment that God issued his curse.

And all of this happened *after* Genesis 1 said that God had *finished* the creation.

* * *

It is interesting to note that if we limit ourselves to just what the Garden of Eden story *actually says*, without burdening it with creationist imagination, it gives a fairly accurate, although figurative, picture of human prehistory. The evolution of agriculture did in fact involve two characteristics to which Genesis alludes:

- Hunter-gatherer humans did, in fact, live in a kind of Eden, although it was a hard life. Once they began raising their own food on farms, all of human society changed. Agriculture allowed the production of more food than humans could gather from natural habitats. But it also resulted in the concentration of power in the hands of the rich and the oppression of the poor. Humans, *as a whole*, did not raise their crops "by the sweat of their brows," to use the language of Genesis. *Poor* humans, mostly slaves, did this; rich humans just ate the food. Agriculture was, in fact, associated with "the sweat of your brow" for most of humankind.
- Once farmers began tilling the soil, making it into fertile ground for the growth of crops, the soil also became the ideal place for weeds ("thorns and thistles") to grow. Weeds are not, generally speaking, wild plants. They are plants that have adapted, within the past few millennia, to living on farms. Their life cycles are adapted to the annual pattern of plowing. This is why many weeds are annual plants; like the crops alongside which they grow, they complete their life cycle, from seed to seed, in a single year. The only difference between crops and weeds is that humans breed crops and plant them, while weeds grow on farms without our permission. Agriculture, in fact, inevitably results in the evolution of weeds.

If we read the Genesis story figuratively, we see a picture of human prehistory. It takes creationist imagination to make that story ridiculous. (If you have ever wanted to have this figurative version of Genesis explained to you by a talking gorilla—and who hasn't?—you should read the novel *Ishmael* by Daniel Quinn.)

This is why when you see the gentle beauty of a forest or a mountain, what you are actually seeing is a damned and cursed world according to the creationist view. But it is interesting to note that this view of creation is not too different from the ecological and evolutionary view of nature. What seems to a hiker a gentle forest is actually pervaded by competition. The trees are competing against one another—very slowly and not consciously—to get as much light and water as they can at the expense of neighboring trees. Both predators and prey are on the verge of starvation. They can never take a day off from their hunt for food, for if they do, the other members of their species will gobble up the resources. The early bird gets the worm, every day. Populations grow as big as they can, pushing right up against—and sometimes going beyond—the limits of their resources. When you hear a male bird singing, it is not singing for happiness but to announce its territory ("Mine! Mine! Mine!") and to attract mates ("Come here, baby! I've got a good territory with plenty of food for our chicks!"). Plants produce flowers not to be pretty but to attract pollinators; flowers are an investment on the part of the plant, an expensive one at that. That is what the natural world is like. It isn't pretty. It's ecology. You could say that the natural world is laboring under the curse of natural selection and evolution. No animal, plant, or even bacterium could just sit back and enjoy life. If they did, other organisms would drive them into extinction. It isn't pretty. It's evolution. And there's no way to stop it.

But remember that it was this world of competition, predation, and hard work that the psalmist praised in Psalm 104. The psalm exclaims what a beautiful world it is when lions are on the prowl and when people get up and go to work by the sweat of their brows. If we join in with the psalmist, we see that the evolved and evolving world is not a problem to be solved but a mystery to be experienced.

* * *

In the next article in this series, we will discover how, in the creationists' view, God played with atoms—and with our brains—to create a deceptive world. ■

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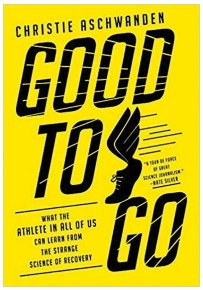
When Athletes Fall for Bogus Gimmicks

TERENCE HINES



Good to Go. By Christie Aschwanden. New York: W.W. Norton. 2019. ISBN 978-0-393-25433-4. 302 pp. Hardcover, $27.95.

The more desperate people are to achieve some goal, the more likely they are to fall prey to quack and pseudoscientific treatments or aids. Thus, the seriously ill are often easy targets for quack medicine. Parents of autistic children are taken in by a whole range of fake treatments and cures. But the ultra-healthy can also fall into this sort of trap. By the *ultra-healthy*, I mean individuals heavily involved in professional sports or amateur athletics. In the new book *Good to Go*, Christie Aschwanden provides an excellent survey of the variety of crazy regimens used by athletes to speed and aid recovery after training.

The often very expensive gimmicks and gadgets that athletes—professional and otherwise—use to enhance recovery after a training session are little more than expensive placebos. Some can cause real harm. The book covers a plethora of practices, both well-known and widely accepted in the training community by coaches, trainers, and athletes alike as well as some that are less well known and bizarre. In the former category is drinking copious amounts of water. Aschwanden reviews the evidence that shows that if you're not thirsty, you don't need to drink a lot more water. Hyperhydration, or water intoxication, is a real problem that leads to hyponatremia. Pay attention to what your body (specifically your hypothalamus) is telling you, not what some coach or trainer is advising. Then there's Gatorade and all the other sports drinks, widely accepted as an almost necessary part of any recovery or training program. But "the dazzling powers that sports drinks display in the studies touted by their makers may be nothing more than the placebo effect" (39) because "studies using plain water for the control group found positive effects, while the ones that used taste-matched placebos didn't" (40).

In the new book *Good to Go*, Christie Aschwanden provides an excellent survey of the variety of crazy regimens used by athletes to speed and aid recovery after training.

In the category of less well known and bizarre is cryotherapy. That's where you get in an enclosed box where the air is cooled to as much as *250 degrees below zero* Fahrenheit. Granted, you don't stay in the cryotherapy box long, just long enough to feel it—and rack up a hefty bill on your credit card. There is no evidence whatsoever that such gimmicks have any beneficial effect other than a placebo effect. It must be noted that it would be next to impossible to carry out truly blind placebo studies of some of the treatments discussed in the book. For example, how could you subject someone to 250-degree-below-zero temperatures without them knowing it? And how about the Tom Brady–endorsed "TB12" pajamas, for a mere $199.98 a set? What makes these so wonderful? They contain a bioceramic powder that "supposedly absorbs body heat and reemits it as far infrared radiation" (139). This is exactly the type of pseudoscientific gibberish that Gwyneth Paltrow's company Goop throws around and gets (completely) justified ridicule for. Obviously, this sort of nonsense can be used to sell overpriced crap to healthy, wealthy, worried athletes as well as to healthy, wealthy, and worried non-athletic women.

Even when a sports product probably has beneficial effects, the same benefits can be obtained much more cheaply by buying generic equivalents. A company called Advocare sells expensive post-workout recovery shakes containing carbohydrates, protein, and calories. One would get "approximately the same nutritional value from a bowl of Greek yogurt and a banana" (168) as one would get from the Advocare shake. Aschwanden skewers several more such scams aimed at the sporting crowd. But one thing that makes her book so appealing is that she tried all of these things herself to see if they had any effect for her. They did not. What makes her personal evaluations of these products especially important is that she is a highly trained sportswoman, having excelled at running, cycling, and skiing. She is no stranger to the culture

of extreme training and the desperation of those who think they need just that tiny little bit of extra advantage to win the next race.

Chapter 8, "Selling Snake Oil," is devoted to dietary supplements. It will come as no surprise to readers of this magazine that such supplements are worthless. The author addresses why supplements are such a big deal in sports. In addition to the ever-present placebo effect and peer pressure, another answer is strong-arm marketing. "Supplement makers bring money to the table, and they spread this money around—to organizations, coaches, trainers, teams, and individual athletes. Along the way, a lot of people get a chance to make a buck" (183). Even the International Olympic Committee has recognized that athletes use supplements "based on unfounded beliefs" and because of people who are "influential rather than being experts" (183). Worse, supplements are often contaminated with performance-enhancing substances that are banned by various sports agencies. Aschwanden recounts a case where an athlete took such a supplement, not knowing that it was contaminated, and was banned from the sport in question for a length of time.

Good to Go is much more than an excellent description of the foolish gimmicks that sports enthusiasts will buy. Aschwanden, with no references at all to the skeptical literature, makes all the right points about how to evaluate dubious claims of scientific support for any treatment. The first chapter is a lovely description of her own involvement in a study to see whether drinking a little beer after a "hard" training run would be beneficial. She goes through the difficulties of picking a valid dependent measure, of defining what constituted a "hard" training exercise, how to assign individuals to a control versus an experimental group—in short, all the issues that crop up in any experiment testing the effects of some manipulation. The results of the study showed that drinking a little beer was beneficial but only for the females in the study.

Aschwanden then proceeds to beautifully take apart her own study, pointing out that there was a very small sample size, that there were problems with the placebo drinks used, and that the finding that beer was beneficial for women but not for men was probably a false positive error. She then discusses the fact that the great majority of studies finding benefits of some sports-related manipulation suffer from these same problems—small samples, isolated findings, and dodgy statistics. The file drawer problem is also mentioned, demonstrating that it's easier to get studies showing a difference between conditions published than it is to get a study published that didn't find any differences. Marketers love small, cheap, and badly done studies because these are just the ones most likely to conclude, incorrectly, that the gimmick being tested has a positive effect. The study can then be cited as "scientific" evidence that whatever is being sold really works. Along these lines, Aschwanden makes the very important point that one study can never settle an issue. Science advances at a slow pace, and no single study can ever be definitive. This chapter alone is worth the price of the book. I plan to use it in any class I teach where understanding the basics of research methodology is important.

Many athletes work as hard on recovery after training as they do during training. There is a large market for tests that claim to be able to detect effects of overtraining. These are covered in a chapter titled "The Magic Metric." Many of these tests have multiple measures. If one takes enough measures on a perfectly normal individual, just by chance one or more will show something "abnormal." One such test is "Blueprint for Athletes," a blood-based test sold by Quest Diagnostics. True to form, Aschwanden subjected herself to this test, in which someone comes to your home and draws blood that is then analyzed for abnormalities. The test generates forty-three different measures. Out of that many measures, it is very likely that one or two will be "abnormal" even if nothing is wrong. Sure enough "my eGFR [estimated glomerular filtration rate] was low and my creatinine was high" (211). But "my numbers were only slightly off, and probably not a cause for concern" (211). From a marketing standpoint, having a lot of measures makes it much more likely that the individual can then be sold some supplement to correct that "abnormal" finding that isn't of any real concern in the first place.

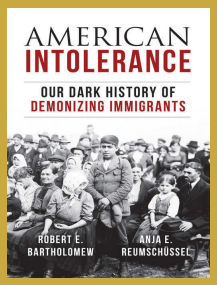
So if all the gimmicks, rituals, and supplements athletes engage in to improve their performance and recovery are little more than expensive placebos, does anything work to help recover from a stressful workout session? The answer is a comforting "yes" that carries with it minimal expense. As noted earlier, water is important—regular water, not sports drinks—and no more water than is needed to quench the thirst. The other important recovery aid is sleep. Aschwanden's review of the research on recovery shows that many athletes work nearly as hard at recovery as they do in their original training. That's counterproductive and can cause anxiety about working hard enough to recover from training. Recovery should generate *less* anxiety, not more. Just taking time off from training and getting adequate sleep and relaxation is vital. Further, training itself should increase in difficulty gradually—no spurts when the athlete jumps rapidly to a new, much higher level of exertion.

Good to Go is a valuable contribution to the skeptical literature because it covers an area in which outlandish health claims have not previously been subjected to any, or at least much, critical analysis. Athletic health quackery is clearly an area in which much skeptical thinking is needed. ■

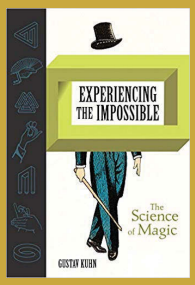
Terence Hines is professor of psychology at Pace University and author of *Pseudoscience and the Paranormal*.

[NEW AND NOTABLE

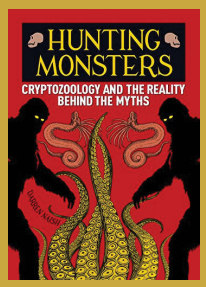
Listing does not preclude future review.



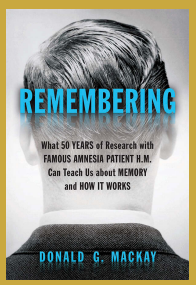
AMERICAN INTOLERANCE: Our Dark History of Demonizing Immigrants. Robert E. Bartholomew and Anja E. Reumschüssel. The authors, a sociologist (and CSI fellow) and a science writer, vividly document the long history of abuses against immigrants throughout the history of America from sentiments against Germans and Irish, Chinese, Jews, Mexicans, Native Americans (hardly immigrants!), and of course the mistreatment of African Americans from slavery to the injustices of today. While we have accepted tens of millions of immigrants, there has always been a troubling history of persecution, demonization, and scapegoating. We'd like to forget these tarnished episodes and think they're all in the past, but current events show that the same strands of intolerance and mistrust are active today. Prometheus Books, 2018, 288 pp., $24.



EXPERIENCING THE IMPOSSIBLE: The Science of Magic. Gustav Kuhn. An examination of the psychological processes that underpin our experience of magic. Kuhn, a psychologist (at Goldsmith's College, London) and a magician, draws on the latest psychological, neurological, and philosophical research. He offers a scientific theory for misdirection, at the heart of all magic tricks, and explores our propensity for magical thinking, the malleability of perception, misremembering, and how magic is applied outside of entertainment. MIT Press, 2019, 296 pp., $27.95.



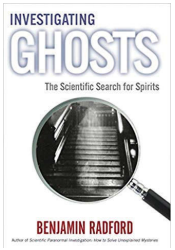
HUNTING MONSTERS: Cryptozoology and the Reality Behind the Myths. Darren Naish. Over the course of seven chapters, professor of paleontology (and author of the *Tetrapod Zoology* blog) Naish takes readers through the world of cryptozoology—the study (or search for) hidden, unknown, or "out of place" animals. There are hundreds of cryptozoological mysteries, and Naish devotes a chapter each to sea serpents, lake monsters, Bigfoot (and their related versions), the dinosaurian Mokele-Mbembe "and other prehistoric survivors," and wraps up with "Mystery Marsupials and Other Oddities." The book is nicely illustrated and presents an up-to-date overview of the scientific evidence for and against (spoiler: mostly against) the existence of these creatures. An excellent addition to the skeptical literature on the subject, along with *Abominable Science* by Daniel Loxton and Donald Prothero. Sirius Press, 2017, 240 pp., $9.99.


REMEMBERING
What 50 YEARS of Research with FAMOUS AMNESIA PATIENT H.M. Can Teach Us about MEMORY and HOW IT WORKS
DONALD G. MACKAY

REMEMBERING: What 50 Years of Research with Famous Amnesia Patient H.M. Can Teach Us about Memory and How It Works. Donald G. MacKay. Beginning as a graduate student at MIT, MacKay began analyzing the errors in speech, comprehension, and visual perception of the famous amnesia patient Henry Molaison to better understand how damage to the hippocampus impairs learning and how normal

A Friendly Guide Showing How Ghost Hunters Go Wrong

BRIAN D. PARSONS



Investigating Ghosts: The Scientific Search for Spirits. By Benjamin Radford. Corrales, New Mexico: Rhombus Books. 2018. ISBN: 9780936455167. 320 pp. Paperback, $19.99; ebook, $16.99.

Did you feel that? A cold breeze just brushed the back of your neck, but it's not a ghost. That sensation is actually the cold, hard truth as presented by Benjamin Radford in his latest effort, *Investigating Ghosts: The Scientific Search for Spirits*. This refreshing book peels back the mystery and misperception of ghostly phenomena as they pertain to self-branded ghost hunters and investigators.

To the average skeptical mind or true believer in ghostly phenomena, this book may appear to be another work of pointing out logical fallacies that nonscientists fall for in the fad of ghost investigating and beating them over the head with how wrong they are about everything. But the scope is far broader than that. This book does point out the multitude of issues with ghost investigations, but it is fair, honest, and—most importantly—objective about why these are issues. The book also offers many solutions along the way.

Radford's focus with this book is honest and forthcoming. He's not trying to prove ghosts do not exist; he's pointing out to those involved in that arena that not all is what it seems, from the tools of the trade to the beliefs behind what people think ghosts are (and are purportedly capable of). So far, yes, ghosts do not exist. His goal is to turn on the lights of science and expose the shadows of misunderstanding, misperception, and gullibility that pilot the ghost investigation scene. The endgame with this book truly feels like Radford is trying to help those who investigate ghosts understand what they are doing wrong and to set them up for success by explaining things simply and pulling no punches.

Investigating Ghosts leaves no tombstone unturned as it covers every topic imaginable that every ghost investigator has dealt with or avid follower of ghost shows has seen on television. The amount of content put into this book is almost overwhelming, but it is put together in three simple parts and builds upon itself within its dozen chapters. The book flows very nicely in content,

and you feel the genuine personality behind the author, which makes it an easy read. Radford's background in psychology (and science in general) and education is felt throughout this book. His twenty-plus years as a ghost researcher and mystery solver adds a depth to this work that I feel only he can add. Factor in the networking with other researchers and the on-point references to his observations, and this is the most solid book on "how to become a ghost hunter" that I've ever read—especially with Radford's objectivity.

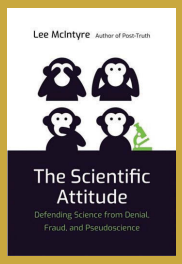
One of my personal beefs with the ghost field is ghost hunters' reliance on tools and tech. They search for ghosts with their faces fixated on screens, which makes as much sense as turning off the lights to see shadows in the dark while carrying flashlights. While there is only one chapter dedicated to ghost hunting equipment, the sentiment of its limits is repeated throughout in meaningful moments. Radford says, "… the equipment is only as scientific as the person using it." Simple but powerfully accurate. There are dozens of other quotes on a variety of topics that may seem like common sense, but they are necessary to separate the ghost hunter from his or her misleading logic of how ghosts and science work.

I was a fan of Radford's earlier book *Scientific Paranormal Investigation: How to Solve Unexplained Mysteries*, and while parts of that book appear in this latest work, it helps tie together this ghost-centric mystery-solving guide and does not feel like it was rehashed. In a few places, Radford referred to his earlier works to help give the reader a lot more depth with certain topics along with a plethora of other resources to help even the most hardcore believers come to their senses.

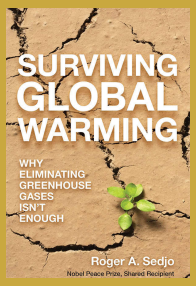
I only wish I had a book like this when I started out researching ghosts in the mid-1990s, and one can hope that every ghost researcher out there will pick up this book. However, the ones who really need to read this will probably sidestep it or ultimately throw it against the wall due to the multitude of truths revealed within. Again, the one thing that I can say to any ghost researcher reluctant to read this book is that Benjamin Radford is not saying ghosts do not exist. He's merely explaining and demonstrating that ghost researchers have been going about things wrong for a very long time. In this book, he provides clarity and the understanding that whatever is going on in the ghost field is not working. *Investigating Ghosts* will help its readers use real science in their efforts. ■

Brian D. Parsons has been investigating claims of anomalous phenomena for just over twenty years. He is an author of six books (on ghosts, cryptozoology, and UFOs with a balanced look), a public speaker, and a radio show host where he spends a majority of his time explaining the rational side of paranormal claims and stories.

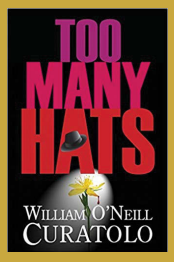
people create new memories. Now professor emeritus of psychology at UCLA and founder of its Cognition and Aging Lab, MacKay reviews the lessons of his fifty years of research with Molaison, among them the profound importance of memory in virtually every human attribute. His research also shows how to keep memories sharp and how to offset degradation of memory in aging. Prometheus Books, 2019, 400 pp., $25.



THE SCIENTIFIC ATTITUDE: Defending Science from Denial, Fraud, and Pseudoscience. Lee McIntyre. Science philosopher McIntyre examines the demarcations between science and pseudoscience, noting that attacks on science are common today, from doubts about the origin of global warming to vaccine safety and even evolution. McIntyre argues that "the scientific attitude" (caring about evidence and being willing to change theories on the basis of new evidence) is a key difference between the two. He examines how one of the most important applications of science to humanity, medicine, evolved and progressed as it gradually embraced the scientific attitude. Regarding ancient medicine, including skull drilling, bloodletting "cures" used to treat in the theory of humors, and so on, McIntyre reminds us "It is not just that the theories in circulation at the time were wrong—for, as we have seen, many scientific theories will turn out to be mistaken—but that most of these ideas were not even based on any sort of evidence or experiment in the first place. Medicine did not yet have the scientific attitude." Elsewhere McIntyre examines the nature and consequences of fringe science, scientific fraud, and science denialism. At a time when science is coming under increasing attack, it's more important than ever to distinguish science from pseudoscience and nonsense. The MIT Press, 2019, 288 pp., $27.95.

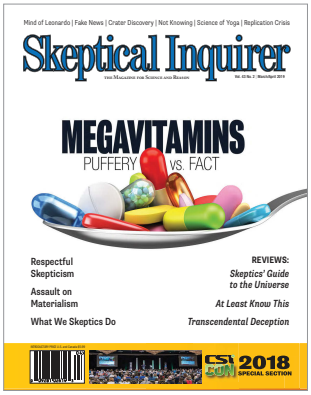

SURVIVING GLOBAL WARMING
WHY ELIMINATING GREENHOUSE GASES ISN'T ENOUGH
Roger A. Sedjo
Nobel Peace Prize, Shared Recipient

SURVIVING GLOBAL WARMING: Why Eliminating Greenhouse Gases Isn't Enough. Roger A. Sedjo. The author, senior fellow emeritus at Resources for the Future in Washington and a contributor to the 2007 Intergovernmental Panel on Climate Change report, argues that we must go beyond just trying to curb greenhouse gas emissions and instead enact strategies for adapting to a warmer world. Rising sea levels, changes to agriculture, increasing hurricane intensities, destruction of forests and biodiversity—all these must be planned for. Even if we were to reduce emissions, natural forces might keep warming the climate, as they have at times in the past. Prometheus Books, 2019, 288 pp., $24.



TOO MANY HATS: Herbal Medicine and the Mob. William O'Neill Curatolo. This is a novel in which one of the characters is a muckraker obsessed with stopping herbal medicine conmen. The author, a biochemist who has had a long career in drug formulation at a major pharmaceutical company, emphasizes a scientist's efforts to expose and stop adulteration of herbal remedies. He casts his story in the noir tradition where bad decisions lead down paths to bad ends. Bayberry Institute Press, 2018, 275pp., $12.

—Kendrick Frazier and Benjamin Radford



Respectful Skepticism?

Craig Foster ("Respectful Skepticism," March/April 2019) makes the serious linguistic mistake of treating *disrespect* as the negative counterpart of *respect*—which it is not—and then builds on this mistake in arguing that we skeptics should respect crazy ideas and the misguided people who hold them. Of course we shouldn't indulge in "disrespecting" other people, if by that one means behaving in a rude, arrogant, or condescending manner, but it doesn't follow from the admonition to be polite that we should accord respect to noxious beliefs based on superstition, religion, and ignorance that do not deserve respect.

I don't respect parents who deny their children medical care and let them die because they are devout Christian Scientists. I don't respect suburbanites who put their communities at risk by not allowing their kids to be inoculated against measles because of stuff they read on social media. I don't respect my Muslim friends when they celebrate the Prophet Abraham for intending to murder his son because he heard voices from God telling him to do so. I don't respect New Age people who don't know the difference between astronomy and astrology. And I certainly don't respect flat-earthers or evangelicals who think that Darwinian evolution is some kind of leftist/atheist plot.

Maybe Foster (and Kendrick Frazier, who endorses this viewpoint in his editor's note) is right that we could communicate more effectively with people who hold such ideas if we put our critical faculties aside and meet these people on their own terms. However, I couldn't do that and still preserve my *self-respect* as a rational, intelligent human being. And to me, that's the essential respect we need to be true to.

Paul Newman
Distinguished Professor of Linguistics, Emeritus
Indiana University
Bloomington, Indiana

Craig Foster told the audience at CSICon that people with pseudoscientific beliefs were open to people of other viewpoints, feel that scientific institutions had not been fair to them, and wanted to hang out with like-minded people, implying that this was somehow just innocent.

The Nazis behaved in this fashion when they determined Jews were subhuman. Climate change deniers help the Koch brothers continue polluting for profit when they act in this manner. During my pediatric residency training, one of my preceptors called me "subhuman," and my residency director did everything he could, legally and illegally, to throw me out. Should that entitle me to reject the legitimate science I learned and harm patients? A father I met once rejected vaccines for his children because, apparently, he was thrown out of veterinary school. Should I respect him for risking his children's lives because he did not become a veterinarian?

Of course we should be empathetic to people who cling to irrational beliefs. But at the core we find "I'm ignorant, possibly emotionally immature, and intellectually lazy; I'm proud of it, and I'd much rather hang out with other ignorant and intellectually lazy people than to grow." That's hard to respect.

We must change course when presented with corroborated facts. During my career, both medical students and nurses have had occasion to ask me to change course on a patient. Sometimes the hair on my neck would stand up. But after I took a breath and looked at the research they presented to me, I tried their suggestions with good results. I am grateful that they respected me enough to be assertive yet professional and logical in their disagreement with me. Both my patients and I have benefitted.

Ron M. Aryel, MD
Reno Center for Child and Adolescent Health
Reno, Nevada

Craig Foster responds:

The critical idea—one tough for people to grasp (me included)—is to respect the person even if one dislikes the behavior. In that spirit, I have argued one should respect (and accordingly not disrespect) others, even when those others are promoting claims that are unreasonable and harmful. This should not be conflated with respecting or tolerating their behavior. I do not believe that one should respect crazy ideas, nor do I believe that the promotion of unreason is innocent.

Correspondingly, I am in absolutely no way arguing skeptics should reduce their fervor in fighting unreason. Rather, skeptics should consider this strange place where they try to separate their antagonism toward unreasonable claims from their antagonism toward the people making them. To this point, it is important to remember that (a) almost everybody promotes unreason once in a while, (b) people come to promote nonsense for reasons outside of their "free will," and (c) respectful approaches are more likely to be effective.

I think this is generally true, although even I wonder if respectful skepticism should have boundary conditions. The frustration and anger that skeptics experience surely motivates them to fight back—to everybody's benefit. Still, people are more willing to listen seriously to people they like and respect, so it behooves skeptics to be likable and respectable.

I agree that respect and disrespect are importantly distinguished, and I think this is worthy of deeper consideration. Psychologists sensibly separate avoiding negative behavior from engaging in positive behavior at times. I would agree further that if skeptics had to choose between the two, avoiding disrespect might be more effective than trying to engage in respect. I would absolutely love to see a skeptical world in which we spend more time considering this type of issue. I tip my hat for raising it. In the meantime, please understand that "Non-Disrespectful Skepticism" is an awkward mouthful. Thus, I am not sure skeptics would consider it as thoroughly, even if it might represent a better practical approach at present.

Fake Health News?

I was introduced to Skeptical Inquirer at a young age and have been a subscriber ever since. I am neither a scientist nor an intellectual, but I consider myself a thoughtful person when it comes to science and evidence-based information, particularly with respect to healthcare. I have worked clinically for more than ten years, and because I also teach the public as part of my profession, I have come to learn that how we say things matters. I have been a regular attendee at yearly health literacy and numeracy conferences and apply health literacy concepts to every part of my work.

This is why I am writing. I see those "fake news about health products" all the time and cringe (Harriet Hall, "Fake News about Health Products," March/April 2019). But what I am asking is that these types of advertisements, reporters, organizations, etc., just be called what they are: advertisements disguised as news, "reporters" that don't exist, and made-up organizations made to look like the real thing.

I recognize you did go on to use these more apt descriptors, which do tend to be more of a mouthful than *fake* and maybe not as catchy. Unfortunately, *fake* as a descriptor of news, etc., has the capacity to produce connotation, connection, association, or charged sentiment with the currently wildly overused expression *fake news*, which I suspect was perhaps partly your inten-

tion. I found myself having to consciously fight thought-distractions through the repetitive use of the term *fake* throughout your article. I stayed vigilant! But I fear your message may be unintentionally diminished or even lost in this world of 140-character communication, memes, and throwing shade.

Rachel Martinez
West Linn, Oregon

I'm as dismayed as Harriet Hall is about ads for dubious health products pretending to be news stories. But I'm also dismayed by her reaction: to cancel her subscription to the local newspaper. We need local newspapers now more than ever. Perhaps a better response might have been to approach the paper as a paying subscriber and insist it make it clearer that such articles are paid ads. It could put disclaimers in larger print and set off the articles with borders to differentiate them from news stories. Perhaps she could send letters to the editor and the publisher. She could submit a column such as this one to point out the folly of blurring the line between ads and news content.

Cancelling her subscription does nothing but save $82.34 a month. Okay, it also provides a more tranquil life for Hall. But it does nothing to end the problem: spreading misinformation to people who are less astute than she is. And what is she missing by refusing to support her local newspaper? There must be some stories she cares about that are not covered by national news outlets.

Nora Raum
Alexandria, Virginia

Harriet Hall responds:

I had hoped that the phrase "fake news" would get people's attention and help them understand the difference between the usual fake news accusations and this kind of demonstrably fake news, where advertisements are being deliberately disguised as news. As for Nora Raum's concerns, I had written the newspaper's publisher and editor many, many times over the years about similar issues and had given up on them. I had offered guest columns, but they were never accepted for publication. I had written letters to the editor, but they told me it was their policy not to print letters to the editor that were critical of their advertisers' products. I had even tried warning them that if a reader died or was harmed by false health information, they could be sued. And they couldn't claim they hadn't known it was false, because I had kept documentation proving that I had informed them it was false. They were unresponsive or offered lame excuses. (Not our fault! We aren't responsible for approving ads!) It was obvious that they didn't care about accuracy in ads, but I did try. I might be criticized for not trying hard enough, but my forte is writing, not activism. I hope my readers will take up the gauntlet.

That 'Fossil' Spark Plug

The object shown formed around a spark plug in your News and Comment piece ("Coso Artifact Decisively Identified," March/April 2019) is an iron-rich concretion just like one I collected decades ago on the beach at Atlantic City, New Jersey (see my photos).

I used this specimen for years both to surprise geology students and to show them that "fossils" don't have to be millions of years old! Local precipitation of iron oxides/hydroxides can occur quickly given the right conditions. Metals at the ends of the spark plug buried in saltwater-saturated sand created electrochemical conditions that caused rusty cement to precipitate in the surrounding sediment. (A larger, elongate nodule collected nearby turned out, when X-rayed, to surround a piece of steel fencepost.)

Whether or not the Coso object includes shells, mine certainly does. And it's hardly surprising that they're modern clams native to the area. For a long time I wondered how a stray spark plug might find its way into the surf. Then one day a student approached me after class and mentioned, "I used to fish from jetties in New Jersey, and we used those things as sinkers." Mystery solved!

If the Coso object was found high and dry in eastern California, as claimed, it must have been left there by a collector. Far more likely it came from the beach and the reported locality information is incorrect.

Bryce M. Hand
Emeritus Professor of Geology
Syracuse University

How Measure Progress?

Steven Pinker's claim that people's view of their well-being is falsely pessimistic (CSICon conference report, March/April 2019) appears to be more an embracement of contrarianism than of scientific skepticism. The claim that we are better or worse off is basically meaningless until there is a definition and agreement on how this is measured.

It is relatively easy to make a judgment about a single factor such as wealth. It is much harder to deal with a multidimensional problem. Counting the number of positive dimensions or adding values is the type of error that climate change deniers often make. Extra CO_2 and a longer growing season are of no value for plants if they die of drought, pests, or heat stress. For plants, the overall measure has to have a multiplicative component, because in this case zero means dead, not just less good.

What time scale are we considering? Two thousand years ago we didn't have the threat of nuclear weapons or climate change. Do we feel better off? A few decades ago the nuclear threat appeared to be waning—but now it is back. Civil rights now appear threatened. Climate change was practically unknown. Should we feel better off?

How do we assess inequity? Are we better off if we have sacrificial groups and everyone else benefits?

Scientific skepticism requires well defined measures, not just vague generalizations.

Robert Clear
Berkeley, California

Steven Pinker responds:

Robert Clear writes that "the claim that we are better off is basically meaningless until there is a definition and agreement on how this is measured." Really? Would Clear be indifferent as to whether he died at thirty or eighty? Whether he lived in extreme poverty or was a member of the middle class? Whether his children had a 30 percent chance of dying before the age of five or a 0.3 percent chance? Whether his wife had a 1 percent chance of dying in childbirth or a .005 percent chance? Whether he had enough food to feed himself or was undernourished and stunted? Whether he had clean running water or had to walk miles with a bucket to fetch water from a muddy well? Whether his children were illiterate or educated? Whether his sons were conscripted into fighting in a bloody war or could work and study in peace? Whether he had to worry about imprisonment or death by torture for publicly criticizing the nation's ruler?

These characterizations of being well off are not controversial. People everywhere opt for them when they have the opportunity, and they have been agreed upon without dissent by the diverse UN member states who signed the Universal Declaration of Human Rights and

then the Sustainable Development Goals. True, all these benefits have side effects and risks—progress is a human accomplishment, not a divine miracle—but the test of whether we have made progress overall was nicely stated by former President Obama: "If you had to choose a moment in history to be born, and you did not know ahead of time who you would be … you'd choose now."

Steven Pinker is professor of psychology at Harvard University and the author of Enlightenment Now: The Case for Reason, Science, Humanism, and Progress, *on which his talk at CSICon was based.*

TM Alleviates Stress

I know your reviewer did not write the book *Transcendental Deception*, he just "reviewed it," so I guess I can't really blame Mr. Szimhart for the misinformation and inaccuracies in his book review (March/April 2019).

While Szimhart explains all the horrible things about TM, he never actually explains what TM, in its essence, actually is. Which is not much! Sitting quietly for twenty minutes twice a day is not a cult or a religion. It is literally just sitting quietly twice a day for twenty minutes. Full stop.

I am sixty-six years old and have been an atheist all my life. I have meditated for forty-six years. I have never been to a "flying class" and have never heard of Vedic cities or pandits. I dismiss all that Hindu gods stuff, and I've never heard of nor do I want a "puja ceremony to Guru Dev."

Yes, I did have to pay to learn to meditate, and I think that is wrong and not necessary. I agree that putting out TM as a business is unfortunate, and, as I said, I don't pay the slightest attention to the Maharishi or Cosmic Consciousness.

I'm sure you will agree with most doctors that stress is one of the biggest problems people face and contributes to most all other health problems. Do the author and reviewer really think sitting and relaxing for twenty minutes twice a day to help relieve the stress of our overly busy lives is comparable to "sorcery, magic, ESP, and communication with metaphysical beings"?!

If specific people who meditate want to believe that stuff, that is their problem and not mine or the fault of the practice of TM.

Sandy McNay
via email

Joe Szimhart replies:

Sandy McNay's last sentence contains the reason Aryeh Siegel wrote Transcendental Deception*: "If specific people who meditate want to believe that stuff, that is their problem and not mine or the fault of the practice of TM." That "stuff" at the core of the TM enterprise is fooling and harming people. Thousands, if not tens of thousands, have taken the Maharishi seriously about TM's power to bring about world peace as if by magic, to make oneself invisible, to connect with deities, to learn to levitate, to cure any disease by a mere switch of mental power, and so on. The common practitioner advertises for TM when they claim that TM relieves stress, lowers blood pressure, and helps them focus. Siegel does not dismiss minor benefits that meditators claim. Nor do I. Siegel disputes the flawed studies that TM produces. So, what is TM? Basic TM, as Sandy McNay likes to practice TM, is merely another form of meditation despite its hype. Responses to meditation vary with the style and the practitioner. But there is a lot more to TM, and therein is the "problem."*

Column on Yoga

I am puzzled by why "The Science of Why Yoga Quiets the Mind: Fitness Industry Hype Obscures Yoga's True Benefits" by Matthew C. Nisbet was even published in the March/April 2019 Skeptical Inquirer. It reads like a standard puff piece concerning the latest health fad.

Sure, it contains a critique of yoga done wrong and points out that some people are making a lot of money promoting yoga for less than honorable reasons. But a lot of articles promoting one fad or another establish their bona fides by criticizing the competition.

And I do not want to disparage Mr. Nisbet. There may be something to what he is saying. What I am saying, however, is that he does not come anywhere near presenting a solid case for the purported benefits of slow yoga (or whatever his particular modality is called within the yoga community).

Patrick J. Russell
Seattle, Washington

The column starts out with a warm testimonial, hypothesizes numerous beneficial health effects caused possibly by yoga's ability to "boost levels of gamma-amino butyric acid," "regulate autonomic features of our nervous system" by "cycling through fast and slow parts of our nervous system" and other pseudoscience babble. It cites as sources for these amazing claims a *New York Times* article and *The Journal of Alternative and Complementary Medicine.* Hmmm ... Where have I heard this sort of thing before?

Please revert to proper skeptical material.

Don Martin
Toronto, Ontario

Bigfoot and Bears

Benjamin Radford's recent Skeptical Inquiree column on a Class A sighting of Bigfoot ("'Class A' Bigfoot Report Reveals Little about the Beast—and Much about the Seekers," January/February 2019) reminded me of an event. A few years ago, on one of my frequent trips to the Philly Zoo, I was walking from the bird house northward when I saw a very strange sight a hundred yards or so away. Two giant, hairy bipeds with long torsos and proportionately short limbs were swatting at each other with their front limbs. I knew that these were bears since I am familiar with the layout of the zoo (I visit frequently), but I had never seen two bears in this one enclosure interacting in such a manner.

As I neared, I could see that they were actually swatting at a broken tree limb hanging by its bark from the tree. The two bears continued to stand and play, until one of them climbed up the tree and tried to rip off the branch from above. The bear fell off, stood upright again, reclimbed, tried to rip down the branch again, fell, and continued standing and swatting with its companion for quite a while.

Whenever I read about a Bigfoot sighting now, I think of those bears and how "human-like" they appeared from a distance and how comfortable they seemed to be on their hind legs.

Joe Dalessandro
Philadelphia, Pennsylvania

Editor's note: Joe Nickell wrote about the uncanny similarities between bears walking upright and reported Bigfoot claims in his September/October 2013 SI Investigative Files column "Bigfoot Lookalikes … ." It is on our website, skepticalinquirer.org.

[FEEDBACK

The letters column is a forum on matters raised in previous issues. **Letters should be no longer than 225 words**. Due to the volume of letters we receive, not all can be published. Send letters as email text (not attachments) to letters@skepticalinquirer.org. In the subject line, provide your surname and informative identification, e.g.: "Smith Letter on Jones evolution article." Include your name and address at the end of the letter. You may also mail your letter to the editor to 944 Deer Dr. NE, Albuquerque, NM 87122.

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